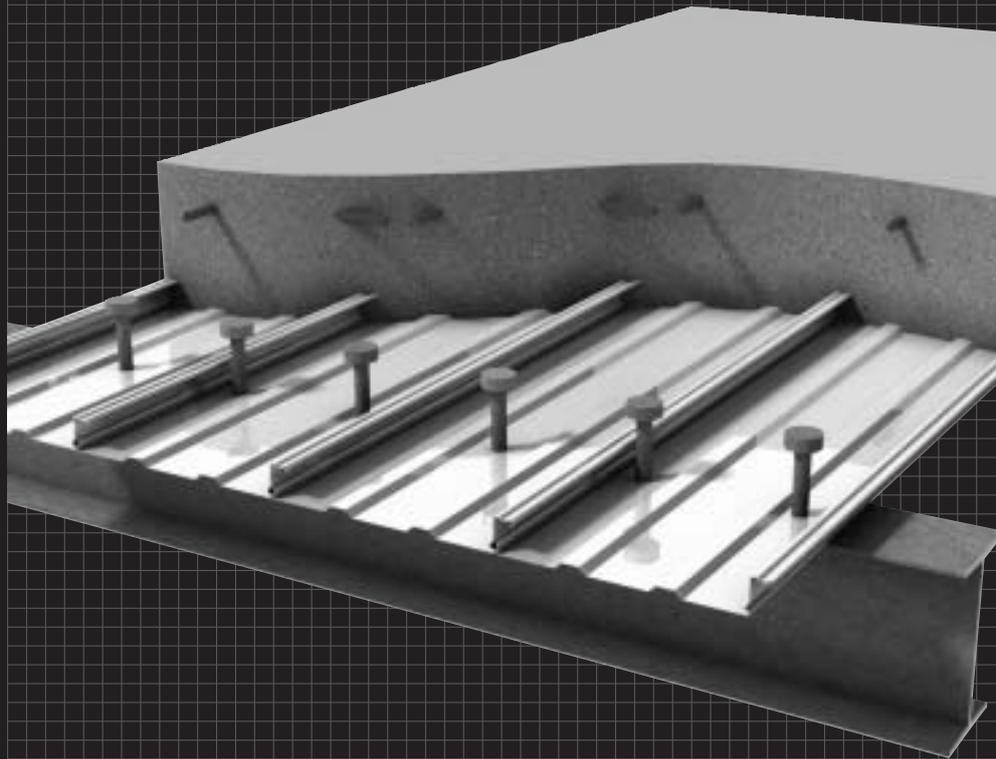


Technical Supplement

Stramit Condeck HP[®] composite slab system

S U P P L E M E N T
F O R S T E E L
F R A M E D
B U I L D I N G S



This guide is a supplement aimed specifically at steel framed buildings intending to use the **Stramit Condeck HP[®]** composite slab system. The intended users of this guide are architects, designers and specifiers but it can be a useful reference guide for both formworkers and steel fixers.

For full installation information relating to **Stramit Condeck HP[®]** composite decking, refer to the **Stramit Condeck HP[®]** Technical supplement 'Installation and temporary propping'.

Introduction

This **Stramit Condeck HP**[®] composite decking supplement for steel framed buildings contains several product features as well as the latest data. Features include:-

- Data for steel framed construction.
- **Stramit Condeck HP Plus**[™] end span enhancement accessory for longer unpropped spans and greater design efficiency. This accessory can now be used to create partial continuity at internal supports where the decking ends.
- Stramit **Condeck Shades**[™] a non reflective coating that enables a more comfortable installation.
- Fire Design method that utilises the fully embedded portion of **Stramit Condeck HP**[®] decking ribs allowing a reduction in Fire Emergency Reinforcement.
- Shear stud placement rules that permit almost unlimited versatility in the number and position of shear studs.
- The use of Partial Shear Connection Theory in line with latest industry best-practice.
- Increased galvanised coating thickness for even greater durability.
- Supplemented by an easy-to-use software package **Stramit Condeck HP**[®] **Slab Designer**[™] 2.3, that allows for variations in span lengths, live loadings including point loads, stacked material loadings and more.

Applications

Stramit Condeck HP[®] composite decking is ideal for floor slab construction in residential, commercial and many industrial applications. It is suitable for use in both steel frame and concrete frame construction, including band beam applications. In addition **Stramit Condeck HP**[®] composite decking has been successfully used in post-tensioned slabs. Whilst generally used in composite construction, **Stramit Condeck HP**[®] decking can be used as an effective lost formwork in conventional slab applications.

Stramit Condeck HP[®] composite decking is only intended for use in composite or non-composite suspended floor slab applications and strictly as shown in this and other current Stramit technical literature. Do not use for any other purpose.

Software

Stramit Building Products (Stramit) has software available for design of **Stramit Condeck HP**[®] composite slabs. **Stramit Condeck HP**[®] **Slab Designer**[™] 2.3 incorporates formwork, composite and fire design considerations, and allows for many more variables and permutations than can be shown in this manual.

Please contact your nearest Stramit office to obtain a copy of the software CD ROM or visit www.stramit.com.au to download the latest **Stramit Condeck HP**[®] technical manual.



Testing

Research and development activity has involved testing at the Centre for Advanced Structural Engineering at the University of Sydney, Centre for Construction Technology & Research at the University of Western Sydney and CSIRO. This has included tests related to fire design, composite action, shear studs, bare steel and deflection. This interaction ensures that Stramit is at the forefront of composite decking design.

Thickness/Mass

Stramit Condeck HP® decking is generally offered in three standard base metal thicknesses of 0.75mm, 0.90mm and 1.0mm. Other thicknesses may be supplied, dependent on lead times and availability. **Stramit Condeck HP Plus™** end span accessory is generally offered in 1.0mm base metal thickness.

Table I

STRAMIT CONDECK HP® DECKING – Thickness/Mass						
Stramit Product	Thickness*		Mass – Z350		Mass – Z450	
	BMT (mm)	TCT (mm)	per unit area (kg/m ²)	per unit length (kg/m)	per unit area (kg/m ²)	per unit length (kg/m)
Condeck HP® decking	0.75	0.78	10.14	3.04	10.32	3.09
	0.90	0.93	12.04	3.62	12.22	3.67
	1.00	1.03	13.31	4.00	13.49	4.05
Condeck HP Plus™ accessory	1.00	1.03	3.6 [#]	N/A	3.6 [#]	N/A

* Base metal thickness (BMT) is used for structural design analysis, whilst total coated thickness (TCT) values are approximate and given for reference only.
[#] Assumes use at every rib, but applies only over that length of the slab (usually end spans only or across internal supports) where utilised.

Materials

Stramit Condeck HP® decking is manufactured from high-tensile (G550) steel with a Z350/Z450 galvanized coating, in full conformance with ASI 397. **Stramit Condeck HP Plus™** end span accessory is manufactured from high-tensile (G550) steel with a Z275 galvanized coating (please note that **Stramit Condeck HP Plus™** end span accessory is always fully embedded within the finished slab).

It is also possible to supply **Stramit Condeck HP®** decking with the underside colour coated. Supply would be subject to project size and lead-time.

Engineering Specification

Maintaining the correct specification of composite decking is important to ensure that all design requirements are met. The following specification is recommended:

- The concrete formwork shall be 0.75 (or 0.90 or 1.00) mm thick **Stramit Condeck HP®** decking with 55mm high ribs spaced at 300mm centres. Material shall be G550 high-tensile steel in accordance with ASI 397, with a Z350/Z450 galvanized coating.
- The manufacturer shall provide independently verified data and documentary evidence enabling fully embedded rib flanges to contribute to fire emergency reinforcement.

- Shear studs are to be positioned strictly in accordance with the manufacturers recommendations for the nominal spacing specified.
- Individual sheets shall be hinged into position in accordance with the manufacturers instructions. Prior to concrete pouring, foot traffic and other construction loads being applied, the **Stramit Condeck HP®** decking shall be propped in accordance with the manufacturers propping table. Reinforcement and concrete placement shall be as directed by the engineer. All work is to be completed in a workmanlike manner and all dirt, mud, debris, screws, rivets, cuttings, etc are to be removed prior to concrete pouring. Props are not to be removed until authorised by the site engineer.

Adverse Conditions

Stramit Condeck HP® decking has excellent durability. However, in applications close to marine or severe industrial environments, or closer than 450mm to the ground, please contact Stramit for a more detailed assessment of your needs, and for guidance on any precautions that may be required.

Compatibility

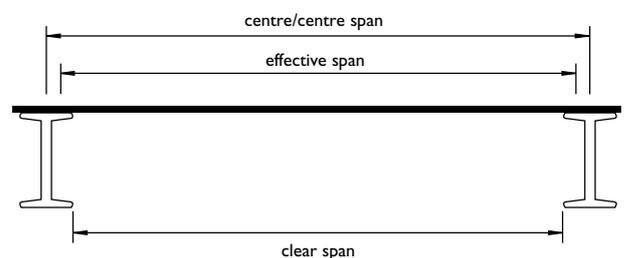
Direct contact between galvanised steel and copper, or water run-off from copper onto galvanised steel must be avoided, as premature corrosion will result.

Span Definition

Throughout this manual the spans referred to are Effective Spans. In the construction phase, the effective span is the lesser of centre/centre distance between permanent supports and clear span +55mm. All span types within the manual reflect permanent supports only. A SINGLE span has 2 permanent supports. A DOUBLE span has 3 permanent supports. CONTINUOUS spans have 4 or more permanent supports.

NOTE

The above effective span definition applies only for stiff supports, e.g. concrete beams, steel I-beams etc.



Design

System Description

This **Stramit Condeck HP**® Composite Slab System comprises of **Stramit Condeck HP**® decking, **Stramit Condeck HP Plus**™ end span accessory (where required), ceiling hangers, **Stramit Edgeforma**™ slab edging and design information necessary for a fully integrated suspended slab.

Design Overview

Design of the suspended slab using the **Stramit Condeck HP**® Composite Slab System requires analysis of three separate functions:-

Formwork mode – including laying of the decking, propping (if required), concrete pouring and curing, and incidental use during this time such as stacked material loading.

Also **Composite slab** or **Fire** modes on which further information can be sought by referring to **Stramit Condeck HP**® Slab Designer™ 2.3 or the latest technical manual.

Design Example

To view a detailed design example use the **Stramit Condeck HP**® Slab Designer™ 2.3 software and invoke a full design printout for an example of your own choosing.

Section Properties

Section properties for **Stramit Condeck HP**® decking and composite slabs are based on AS3600 and comprehensive testing.

Shear Studs

When used in conjunction with steel beams, **Stramit Condeck HP**® decking offers the advantage of being particularly suitable for use with shear studs. The use of shear studs enables the design of highly efficient composite beams.

Stramit Condeck HP® decking offers tremendous versatility in the number and placement of shear studs, due to its fully embedded ribs. Up to 20 studs per metre width are possible when used in a double row, or 10 studs per metre width in a single row along the beam. Standard placements for 19mm diameter studs, along with placement rules are given on page 10 of this manual.

Formwork Mode Design

Selection of **Stramit Condeck HP**® decking thicknesses as shown in Tables 3 and 4 overleaf.

The sections following show the derivation basis of this data. Composite slab design is also required to establish suitability for a given application.

Loading

Loadings are generally in accordance with AS1170.1 and AS3610.

Stage I loading – Construction and Stacked Materials.

Stage II loading – Wet Concrete (including an allowance for ponding), Pattern Loading, Live Loads. Construction load assumed to be 1kPa or 3kPa over 1.6m x 1.6m area.

NOTE Alternative stacked material loadings can be considered by using **Stramit Condeck HP**® Slab Designer™ 2.3 software

Although not included in the design data, consideration may need to be given to wind uplift loads on unattached decking during Stage I construction. Refer to AS1170.2 for wind loads.

Deflection Limits

Actual deflection of metal decks vary significantly due to a range of practical field variables. These include concrete density, concrete placement position & levels of supports. Spans for rib deflections of span/240 and span/150 are given in Tables 3a, 4a and 3b, 4b respectively. These deflections should be regarded as nominal only.

(continued on page 7)

Table 2

STRAMIT CONDECK HP® DECKING – Deck Section Properties (per metre width)							
thickness - BMT (mm)	mass (kg/m ²)*	cross sectional area (mm ²)	Y _{cg} (mm)	total section I (10 ⁶ mm ⁴)	properties for strength limit state		
					M _p (kNm)	M _n (kNm)	R _{int} (100mm bearing) (kN)
0.75	10.32	1211	15.29	0.488	3.96	5.75	35.0
0.90	12.22	1456	15.36	0.583	5.71	7.08	46.6
1.00	13.49	1620	15.41	0.647	6.72	7.98	56.1
Data for Stramit Condeck HP ® Decking with HP Plus at every rib – add the value below to the above for the relevant decking thickness							
1.00	+3.6	#	#	#	+3.0	+2.6	

* Based on Z450 coating mass. # These properties assumed to be unchanged for design purposes. For I values refer to **Stramit Condeck HP**® Slab Designer™ 2.2 software.

Table 3a - Deflection Limit Span/240

STRAMIT CONDECK HP® FORMWORK MODE - Maximum Unpropped Span Lengths (mm)																		
slab thickness (mm)	Single Span Lengths (mm)						Double Span Lengths (mm)						Continuous Span Lengths (mm)					
	0.75mm BMT		0.90mm BMT		1.00mm BMT		0.75mm BMT		0.90mm BMT		1.00mm BMT		0.75mm BMT		0.90mm BMT		1.00mm BMT	
	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*
90	2100	-	2350	2350	2450	2450	2440	-	2930	2930	3090	3090	2450	-	2680	2680	2830	2830
100	2040	-	2280	2280	2380	2380	2370	-	2840	2840	3000	3000	2380	-	2600	2600	2750	2750
110	1990	-	2210	2210	2310	2310	2300	-	2760	2760	2920	2920	2320	-	2530	2530	2680	2680
120	1940	-	2160	2160	2250	2250	2250	-	2690	2690	2850	2850	2260	-	2470	2470	2610	2610
125	1920	-	2130	2130	2220	2220	2220	-	2660	2660	2820	2820	2230	-	2440	2440	2580	2580
130	1900	-	2110	2110	2200	2200	2190	-	2630	2630	2780	2780	2210	-	2420	2420	2550	2550
140	1860	-	2060	2060	2150	2150	2140	-	2570	2570	2720	2720	2160	-	2360	2360	2500	2500
150	1820	-	2020	2020	2100	2100	2100	-	2520	2520	2670	2670	2110	-	2320	2320	2450	2450
160	1780	-	1980	1980	2060	2060	2060	-	2470	2470	2610	2610	2070	-	2270	2270	2400	2400
170	1750	-	1940	1940	2020	2020	2010	-	2430	2430	2570	2570	2030	-	2230	2230	2360	2360
180	1720	-	1900	1900	1990	1990	1980	-	2380	2380	2520	2520	1990	-	2190	2190	2320	2320
190	1690	-	1870	1870	1960	1960	1940	-	2340	2340	2480	2480	1950	-	2160	2160	2280	2280
200	1660	-	1840	1840	1920	1920	1910	-	2290	2310	2440	2440	1920	-	2120	2120	2250	2250
210	1630	-	1810	1810	1890	1890	1880	-	2250	2270	2400	2400	1890	-	2090	2090	2210	2210
220	1610	-	1790	1790	1870	1870	1850	-	2210	2240	2370	2370	1860	-	2060	2060	2180	2180
230	1580	-	1760	1760	1840	1840	1820	-	2160	2210	2340	2340	1830	-	2030	2030	2150	2150
240	1560	-	1740	1740	1820	1820	1790	-	2120	2180	2310	2310	1800	-	2000	2000	2120	2120
250	1540	-	1720	1720	1790	1790	1760	-	2070	2150	2270	2280	1780	-	1980	1980	2100	2100

Based on concrete density 2400kg/m³, reo mass 50kg/m³, stacked material load 1.5kPa in pans, minimum beam width 150mm, rib deflection limit span/240.

*where every pan is fixed to the beam below, spans can be based on results of wet concrete testing.

Slab thicknesses for shaded areas are not recommended for exposed ceilings. The threshold varies with **Stramit Condeck HP®** Decking thicknesses. For 0.75, 100mm slab or less is ok, for 0.90, 180mm slab or less is ok, for 1.00, 230mm slab or less is ok.

Table 3b - Deflection Limit Span/150

STRAMIT CONDECK HP® FORMWORK MODE - Maximum Unpropped Span Lengths (mm)																		
slab thickness (mm)	Single Span Lengths (mm)						Double Span Lengths (mm)						Continuous Span Lengths (mm)					
	0.75mm BMT		0.90mm BMT		1.00mm BMT		0.75mm BMT		0.90mm BMT		1.00mm BMT		0.75mm BMT		0.90mm BMT		1.00mm BMT	
	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*	pan fixing no	yes*
90	2100	-	2540	2670	2760	2810	2440	-	2960	3110	3220	3440	2450	-	2950	3050	3200	3220
100	2040	-	2470	2590	2680	2730	2370	-	2870	3020	3130	3340	2380	-	2870	2970	3120	3140
110	1990	-	2400	2520	2610	2660	2300	-	2790	2940	3040	3250	2320	-	2790	2900	3040	3060
120	1940	-	2340	2460	2550	2600	2250	-	2720	2860	2960	3170	2260	-	2720	2830	2960	2990
125	1920	-	2310	2430	2520	2570	2220	-	2690	2820	2930	3130	2230	-	2690	2800	2930	2960
130	1900	-	2290	2400	2490	2540	2190	-	2650	2790	2890	3090	2210	-	2660	2770	2890	2930
140	1860	-	2240	2350	2430	2480	2140	-	2590	2730	2820	3020	2160	-	2600	2720	2830	2870
150	1820	-	2190	2300	2380	2440	2100	-	2540	2670	2760	2950	2110	-	2540	2660	2770	2820
160	1780	-	2140	2250	2330	2390	2060	-	2480	2610	2700	2890	2070	-	2490	2620	2710	2770
170	1750	-	2100	2210	2280	2350	2010	-	2430	2560	2650	2830	2030	-	2440	2560	2660	2720
180	1720	-	2060	2170	2240	2310	1980	-	2390	2510	2600	2770	1990	-	2400	2510	2610	2680
190	1690	-	2030	2130	2200	2270	1940	-	2340	2460	2550	2710	1950	-	2350	2470	2560	2630
200	1660	-	1990	2090	2160	2230	1910	-	2300	2420	2490	2650	1920	-	2310	2430	2510	2600
210	1630	-	1960	2060	2130	2200	1880	-	2250	2380	2440	2590	1890	-	2270	2390	2470	2560
220	1610	-	1930	2030	2090	2170	1850	-	2210	2340	2390	2540	1860	-	2240	2350	2430	2520
230	1580	-	1900	1990	2060	2140	1820	-	2160	2300	2340	2490	1830	-	2200	2310	2390	2490
240	1560	-	1870	1960	2030	2110	1790	-	2120	2270	2290	2440	1800	-	2170	2280	2360	2460
250	1540	-	1840	1940	2000	2090	1760	-	2070	2230	2250	2390	1780	-	2140	2240	2320	2430

Based on concrete density 2400kg/m³, reo mass 50kg/m³, stacked material load 1.5kPa in pans, minimum beam width 150mm, rib deflection limit span/150.

*where every pan is fixed to the beam below, spans can be based on results of wet concrete testing.

Slab thicknesses for shaded areas are not recommended for exposed ceilings. The threshold varies with **Stramit Condeck HP®** Decking thicknesses. For 0.75, 100mm slab or less is ok, for 0.90, 180mm slab or less is ok, for 1.00, 230mm slab or less is ok.

Table 4a - Deflection Limit Span/240

STRAMIT CONDECK HP® FORMWORK MODE - Maximum Unpropped Span Lengths with HP Plus across discontinuous decking ends at internal supports (mm)																		
slab thickness (mm)	Single Span Condeck HP® (mm)						Double or Continuous Span Condeck HP® (mm)											
	Condeck HP®		HP Plus Accessory		Condeck HP®		Condeck HP® - Double span				HP Plus Accessory				Condeck HP® - Continuous span			
	End span		End span		End span		End span		Internal span†		End span		Internal span†		End span		Internal span†	
	0.75mm BMT		0.90mm BMT		1.00mm BMT		0.75mm BMT		0.90mm BMT		0.90mm BMT		1.00mm BMT		1.00mm BMT		1.00mm BMT	
end span		end span		end span		end span		internal span†		end span		internal span†		end span		internal span†		
pan fixing		pan fixing		pan fixing		pan fixing		pan fixing		pan fixing		pan fixing		pan fixing		pan fixing		
no yes*		no yes*		no yes*		no yes*		no yes*		no yes*		no yes*		no yes*		no yes*		
90	2230	-	2610	2610	2760	2760	2390	-	2500	-	2720	2720	3190	3290	2870	2870	3460	3470
100	2170	-	2530	2530	2670	2670	2320	-	2440	-	2640	2640	3080	3190	2790	2790	3320	3370
110	2110	-	2460	2460	2600	2600	2260	-	2330	-	2570	2570	2980	3110	2720	2720	3210	3290
120	2060	-	2400	2400	2540	2540	2210	-	2220	-	2510	2510	2880	3030	2650	2650	3110	3210
125	2030	-	2370	2370	2500	2500	2180	-	2250	-	2480	2480	2840	3000	2620	2620	3060	3170
130	2010	-	2340	2340	2480	2480	2150	-	2310	-	2450	2450	2790	2960	2590	2590	3010	3130
140	1970	-	2290	2290	2420	2420	2110	-	2120	-	2390	2390	2710	2900	2530	2530	2930	3070
150	1920	-	2240	2240	2370	2370	2060	-	2160	-	2340	2340	2630	2840	2480	2480	2850	3010
160	1890	-	2200	2200	2320	2320	2020	-	2090	-	2300	2300	2560	2790	2430	2430	2770	2950
170	1850	-	2160	2160	2280	2280	1980	-	2060	-	2260	2260	2490	2690	2390	2390	2700	2890
180	1820	-	2120	2120	2240	2240	1940	-	2060	-	2220	2220	2430	2620	2350	2350	2630	2830
190	1780	-	2080	2080	2200	2200	1910	-	1970	-	2180	2180	2370	2560	2310	2310	2570	2740
200	1750	-	2050	2050	2170	2170	1880	-	1890	-	2150	2150	2320	2500	2270	2270	2510	2680
210	1730	-	2020	2020	2140	2140	1840	-	1940	-	2110	2110	2260	2440	2240	2240	2460	2620
220	1680	-	1990	1990	2110	2110	1820	-	1820	-	2080	2080	2210	2390	2210	2210	2400	2560
230	1640	-	1960	1960	2080	2080	1790	-	1830	-	2060	2060	2170	2340	2180	2180	2350	2510
240	1600	-	1930	1930	2050	2050	1760	-	1790	-	2030	2030	2120	2290	2150	2150	2300	2460
250	1560	-	1870	1910	2020	2020	1740	-	1740	-	2000	2000	2080	2240	2120	2120	2260	2410

Based on concrete density 2400kg/m³, reo mass 50kg/m³, stacked material load 1.5kPa in pans, minimum beam width 150mm, rib deflection limit span/240.
 *where every pan is fixed to the beam below, spans can be based on results of wet concrete testing.
 † Note that the maximum internal spans indicated are for use in conjunction with the maximum end spans. To check other combinations of internal and end spans, please use the **Stramit Condeck HP® Slab Designer™ 2.2** software.

Slab thicknesses for shaded areas are not recommended for exposed ceilings. The threshold varies with **Stramit Condeck HP®** Decking thicknesses. For 0.75, 100mm slab or less is ok, for 0.90, 180mm slab or less is ok, for 1.00, 230mm slab or less is ok.

Table 4b - Deflection Limit Span/150

STRAMIT CONDECK HP® FORMWORK MODE - Maximum Unpropped Span Lengths with HP Plus across discontinuous decking ends at internal supports (mm)																		
slab thickness (mm)	Single Span Condeck HP® (mm)						Double or Continuous Span Condeck HP® (mm)											
	Condeck HP®		HP Plus Accessory		Condeck HP®		Condeck HP® - Double span				HP Plus Accessory				Condeck HP® - Continuous span			
	End span		End span		End span		End span		Internal span†		End span		Internal span†		End span		Internal span†	
	0.75mm BMT		0.90mm BMT		1.00mm BMT		0.75mm BMT		0.90mm BMT		0.90mm BMT		1.00mm BMT		1.00mm BMT		1.00mm BMT	
end span		end span		end span		end span		internal span†		end span		internal span†		end span		internal span†		
pan fixing		pan fixing		pan fixing		pan fixing		pan fixing		pan fixing		pan fixing		pan fixing		pan fixing		
no yes*		no yes*		no yes*		no yes*		no yes*		no yes*		no yes*		no yes*		no yes*		
90	2230	-	2700	2830	2940	3140	2390	-	2500	-	2890	3040	2980	3070	3000	3270	3430	3610
100	2170	-	2620	2750	2850	3050	2320	-	2440	-	2810	2950	2940	3140	3060	3190	3200	3490
110	2110	-	2550	2680	2780	2970	2260	-	2330	-	2730	2870	2810	3100	2980	3110	3030	3380
120	2060	-	2490	2610	2710	2890	2210	-	2220	-	2670	2800	2670	2920	2900	3040	2970	3280
125	2030	-	2460	2580	2670	2860	2180	-	2250	-	2630	2770	2760	2780	2870	3010	2880	3230
130	2010	-	2430	2550	2640	2820	2150	-	2310	-	2600	2730	2740	2870	2830	2970	2970	3190
140	1970	-	2370	2490	2580	2760	2110	-	2120	-	2540	2670	2690	2820	2770	2910	2800	3100
150	1920	-	2320	2440	2530	2700	2060	-	2160	-	2490	2610	2520	2810	2710	2860	2740	3010
160	1890	-	2270	2390	2470	2640	2020	-	2090	-	2440	2560	2440	2650	2650	2810	2760	2930
170	1850	-	2230	2340	2420	2570	1980	-	2060	-	2390	2510	2430	2590	2600	2760	2640	2860
180	1820	-	2190	2300	2370	2510	1940	-	2060	-	2340	2460	2420	2570	2550	2710	2600	2790
190	1780	-	2140	2260	2310	2460	1910	-	1970	-	2300	2420	2370	2450	2500	2670	2560	2730
200	1750	-	2090	2220	2260	2400	1880	-	1890	-	2260	2370	2310	2490	2460	2630	2490	2650
210	1730	-	2040	2180	2210	2350	1840	-	1940	-	2220	2330	2260	2440	2420	2580	2420	2610
220	1680	-	1990	2150	2160	2300	1820	-	1820	-	2180	2300	2210	2320	2380	2540	2380	2550
230	1640	-	1950	2100	2120	2250	1790	-	1830	-	2150	2260	2160	2330	2340	2500	2350	2500
240	1600	-	1910	2060	2080	2210	1760	-	1790	-	2120	2230	2120	2240	2300	2450	2300	2450
250	1560	-	1870	2020	2030	2170	1740	-	1740	-	2080	2190	2080	2240	2260	2400	2260	2400

Based on concrete density 2400kg/m³, reo mass 50kg/m³, stacked material load 1.5kPa in pans, minimum beam width 150mm, rib deflection limit span/150.
 *where every pan is fixed to the beam below, spans can be based on results of wet concrete testing.
 † Note that the maximum internal spans indicated are for use in conjunction with the maximum end spans. To check other combinations of internal and end spans, please use the **Stramit Condeck HP® Slab Designer™ 2.2** software.

Slab thicknesses for shaded areas are not recommended for exposed ceilings. The threshold varies with **Stramit Condeck HP®** Decking thicknesses. For 0.75, 100mm slab or less is ok, for 0.90, 180mm slab or less is ok, for 1.00, 230mm slab or less is ok.

Design Principles

In the formwork mode design checks are made for positive and negative moments, deflection and reaction, and critical interactions of these. Critical design checks for formwork mode strength limit-state where pans are not fixed to the beams are:

Single Spans	Double/Continuous Spans
$M_p^* \leq 0.82 M_p$	$M_p^* \leq 0.82 M_p$
	$\frac{M_n^*}{M_n} + 1.2 \frac{R_{int}^*}{R_{int}} \leq 1.2$

If every **Stramit Condeck HP**® sheet is attached permanently to the beam below by a shear stud or by other means, spans can be increased by considering the results of wet concrete testing. These spans are given in Tables 3 and 4. For more information on the design checks, please refer to **Stramit Condeck HP**® **Slab Designer**™ 2.3 software.

Support Frame Types

Stramit Condeck HP® decking is suitable for use on a wide range of support frame types. The most common applications are concrete beam or band beam, steel beam or composite steel beam, and masonry wall. Any structurally adequate continuous support members can be used provided they can withstand bearing loads from the decking.

It should be noted that this supplement is specifically aimed at steel framed buildings. If you require further information on other support frame types please refer to **Stramit Condeck HP**® **Slab Designer**™ 2.3 software or the **Stramit Condeck HP**® technical manual or contact your nearest Stramit office.

Composite Slab Design

For a detailed design explanation please refer to the **Stramit Condeck HP**® **Slab Designer**™ 2.3 software or refer to the **Stramit Condeck HP**® technical manual

Procurement

Obtaining Prices

Prices of **Stramit Condeck HP**® decking and accessories can be obtained from your nearest Stramit location, or distributor of Stramit products.

Components

The **Stramit Condeck HP**® Composite Slab System comprises:-

- **Stramit Condeck HP**® decking – 0.75mm, 0.90mm OR 1.00mm thick
- **Stramit Condeck HP Plus**™ accessory – 1.00mm
- **Stramit Edgeforma**™ slab edging – 1.00mm (for slabs up to 140mm) OR 1.60mm (for slabs up to 200mm)
- **Stramit**® two-part ceiling hanger

Length

Stramit Condeck HP® decking can be supplied in any length up to the limit of the local Transport Authority regulations. Where practical nominated lengths should be site measurements rather than plan dimensions. The tolerance on lengths supplied is +/- 5mm. Ensure that the lengths specified are the actual required sheet length, and not the effective spans used in design.

Orders

Stramit Condeck HP® decking and accessories can be ordered directly from Stramit, or through distributors.

Lead Times

Stramit Condeck HP® decking is normally supplied within 2 to 3 days of placement of order. Please talk to Stramit about current lead times particularly for large or non-standard orders.

Delivery/Unloading

Lead times are subject to location and quantity. Please talk to Stramit about delivery scheduling for large projects. Ensure that suitable arrangements have been made for truck unloading, as this is the responsibility of the receiver. Pack mass may be up to one tonne.

Site Storage

It is recommended that sheets be placed as soon as possible after delivery. If site storage is necessary packs should be kept dry and above ground. If sheets do become wet they should be separated, wiped and placed in the open to promote drying.

Installation

The sub-headings within this Installation section are indicative of the sequence of installation.

Good Practice

Stramit recommends that good trade practice be followed when using these products, such as found in CCAA/Standards Australia handbook HB67 'Concrete practice on building sites'.

Site Induction

Consideration should be given to handling and installation issues as part of site induction safety procedures. Specific consideration should be given to pack handling, avoidance of cuts, trips, slips and falls, long sheet handling particularly in windy conditions, sheet cutting procedures and surface temperature on sunny days. Personal Protection Equipment (PPE) should always be used.

Sheet Handling

Cut resistant or leather gloves should be worn when handling product. Foot protection should be worn when handling and transporting product.

Supports

It is imperative that permanent and temporary supports (steel or concrete beams, walls or props) be stable and of adequate strength to withstand loadings prior to the placement of the decking. Ensure that the end bearing width (min 50mm) and internal bearing width (min 150mm) nominated by the engineer is achieved on site.

In the case of masonry walls, a damp-course strip should be installed between the masonry and the decking.

Walking

Take care when walking on **Stramit Condeck HP**[®] decking, particularly if the surface has become wet. Wear suitable rubber-soled footwear at all times. Also note that, when first delivered, there may be traces of rolling oil present. It is possible to step either in the pans or on the ribs of **Stramit Condeck HP**[®] decking but when walking use only the pans. Avoid walking on the edge sheet, or on rib ends.

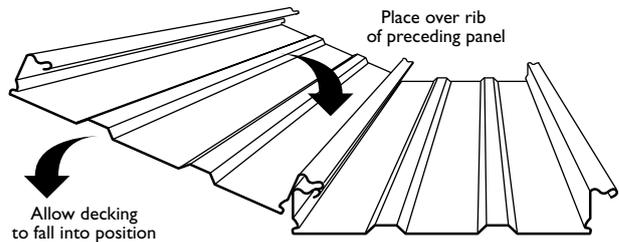
Cutting

Stramit Condeck HP[®] decking is supplied cut to length so that cutting is generally only required around projections and cut-outs. Use a power saw fitted with an abrasive disc or metal cutting blade. It is recommended

that cuts be started with the decking laid upside down (ribs down). Then turn the sheet and, if necessary, complete the cutting of the ribs. This method should provide the neatest finish, and minimise the risk of burred edges being exposed on the finished slab.

Decking Placement

Stramit Condeck HP[®] decking is easily placed by hinging the overlap edge of one sheet over the underlap edge of the previous sheet. If the decking is used as a platform for laying subsequent sheets, designated propping must be positioned first.



Fixing

Once decking panels are laid they should immediately be secured against possible wind uplift. Typically use one fixing per pan at end supports, and one fixing every third pan at permanent internal supports. Self-drilling and tapping screws or powder actuated drive pins are commonly used.

These fixings should be adjacent to the decking ribs. In exposed conditions additional fixing may be required. Shear studs, if used, attached immediately after decking placement, or puddle welds, will provide wind uplift resistance.

Side-Lap Fastening

Side-lap fastening is only required if stacked construction materials are to be laid in the decking pans. Where required, side-lap fasteners should be at least No. 10x16 self-drilling and tapping screws. These should be fixed through the trough in the rib tops, and positioned at mid span on every rib.

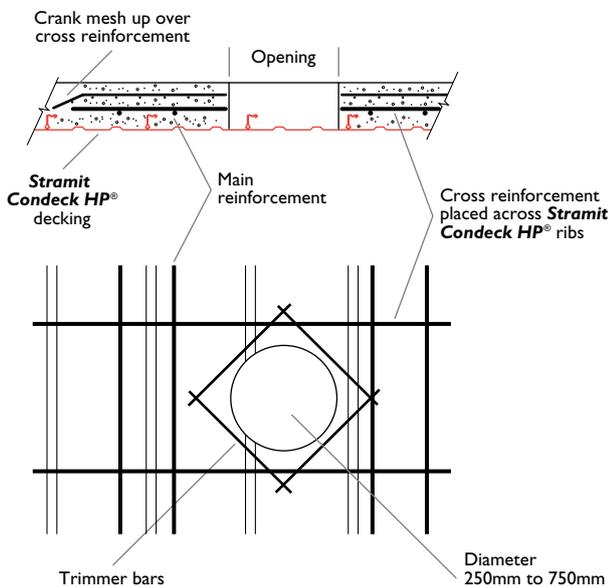
Slab Edges

The edge of **Stramit Condeck HP**[®] composite slabs may be addressed in a number of different ways. For further details please see the product technical manual.

IMPORTANT! Edges of metal deck slabs exposed to direct or indirect rainfall must have a continuous drip feature to prevent water running to the underside of the decking. This is typically achieved by incorporating a formed notch in an all-concrete edge strip overhanging the supports.

Large Slab Penetrations

Floor penetrations can be conveniently formed by conventional formwork methods and then cut out after the concrete has set. The reinforcing shown is required for penetrations of 200mm to 750mm. For large predetermined openings greater than 750mm, such as for stairs, elevators, etc. the most practical method generally is to supply supplemental structural framing to the support system for the **Stramit Condeck HP®** decking. The cross sectional area of reinforcement around the opening equals the area of mesh reinforcement “lost” in the opening. Any decking containing penetrations where the total penetration exceeds 200mm must be assumed to be non-continuous, i.e it must be supported or designed as a cantilever.



Small Slab Penetrations

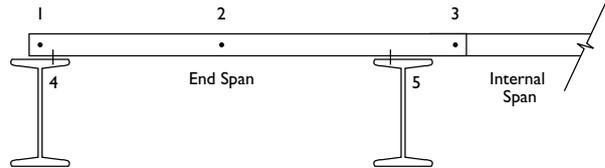
Holes can be cut through a **Stramit Condeck HP®** slab, but this must be done with caution. The following constraints apply:-

1. Always obtain approval from the design engineer prior to cutting.
2. Do not cut holes through the decking prior to concrete placement and cure.
3. Do not position holes within the negative moment region of a continuous slab (i.e. keep clear of internal supports.)
4. Holes must not exceed 200mm diameter, and must be central within the pan of the decking.
5. Holes must be either drilled or sawn using appropriate cutting tools.
6. No other holes/penetrations within 1000mm. Deck with holes of no greater than 200mm meeting the criteria above can be considered to be continuous.

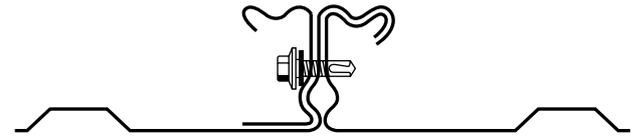
Stramit Condeck HP Plus™

End Span Accessory

Where required by design, **Stramit Condeck HP Plus™** end span accessory is generally used adjacent to every rib in each nominated end span. In fact the accessory is required to be the full length of the end span plus the longer of, an additional 300mm or 10% of the end span length. The additional length protrudes into the adjacent internal span.



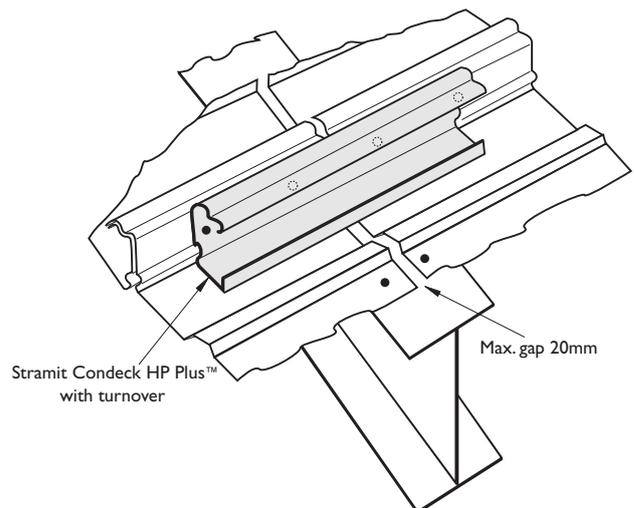
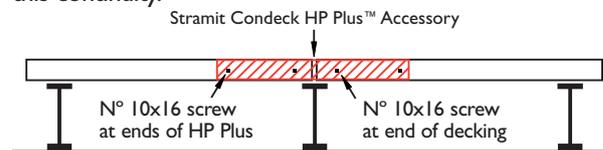
Stramit Condeck HP Plus™ must be attached to the deck at the end support (1), at the middle of the end span (2), and at the accessory end within the internal span (3). Fix using at least No.10x16 self-drilling and tapping screws, fastened through the rib sides as shown below. Also fix **Stramit Condeck HP Plus™** through the decking to both the end (4) and internal support beam (5).



Partial Continuity using

Stramit Condeck HP Plus™

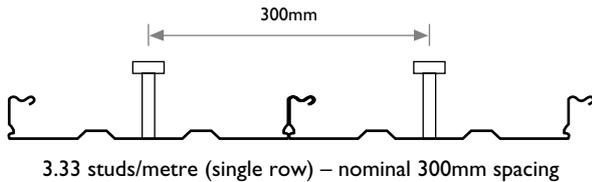
Stramit Condeck HP Plus™ accessory can be used to create partial continuity of decking across an internal support. Where decking ends butt at an internal support beam, either a 1200mm long piece of **Stramit Condeck HP Plus™** or a 600mm long piece of HP Plus with a turn over can be fixed using four screws to each rib to create this continuity.



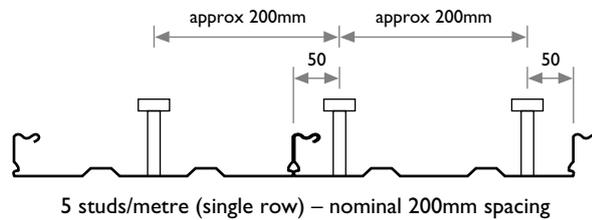
Shear Studs

Welded shear studs may be nominated for use with composite beams. These should be placed into prescribed positions using suitable stud welding guns. Use settings and procedure appropriate for the deck galvanised coating (350g/m² or 450g/m²) and the beam coating/s. Standard placements for 19mm diameter studs, along with placement rules*, are illustrated below:-

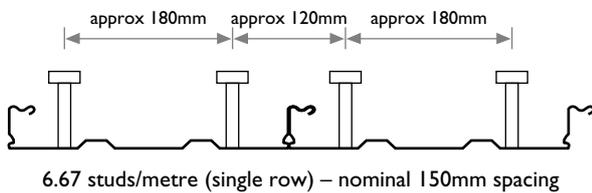
300 SPACING



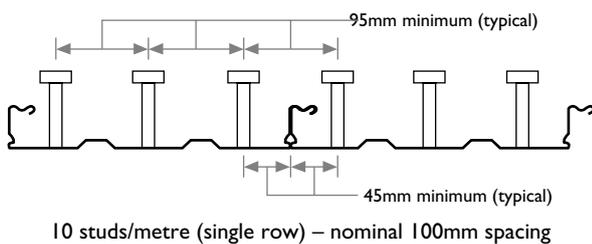
200 SPACING



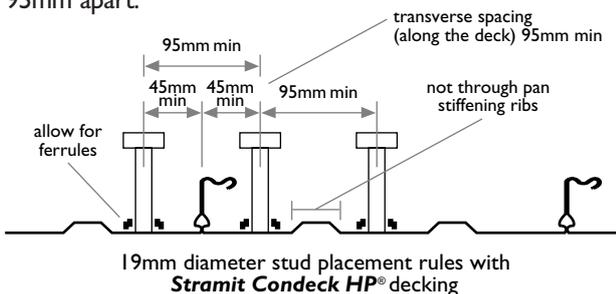
150 SPACING



100 SPACING



Each of the stud/metre values above can be doubled by using two parallel rows of studs, spaced no less than 95mm apart.



* Placement rules have been established by independent tests and evaluation.

Stacked Material

Great care must be taken during construction to avoid damage from stacked materials. The formwork mode data given in this manual is based on a maximum stacked material load of 1.5kPa loaded in the pans.

Other loading cases can be determined using the software **Stramit Condeck HP® Slab Designer™ 2.3**. Refer to the engineer or the design drawings for the stacked material allowance used in design, as this is often varied. If in doubt either do not stack materials onto the decking, or contact your Stramit Technical Representative.

Sealing

Stramit Condeck HP® decking provides resistance to leakage during concrete pouring. For most applications where the concrete slump is not excessive no sealing is required. To prevent slurry leakage (if required) just tape over the small ceiling hanger recess near the bottom of the ribs, and the two pan stiffening rib recesses, at each sheet end.

Mesh Placement

Place shrinkage and temperature reinforcement (fabric) such that minimum cover requirement as per AS3600 is satisfied (generally 20mm to 30mm cover from top of slab or on top of the deck ribs for thin slabs).

- The fabric shall be properly lapped and tied to ensure continuity in both directions.
- If the slab has been designed as continuous, then additional steel reinforcement as specified by the Engineer shall be provided over supports.

Concrete Pouring

Finally, the concrete must be poured evenly to the panel ends on the prepared clean deck, in the direction of span of the decking. Heaping of wet concrete must be avoided.

The concrete should be placed in accordance with the requirements of AS3600 and have a minimum 28 day compressive strength $f'_c = 25\text{MPa}$ and slump satisfying the Engineers requirements. As a guide, the slump should be 60mm – 80mm for vibrator compaction. Hand compaction is not recommended.

Admixtures

Chemical admixtures are allowed provided they are in accordance with AS3600. (Cl. 19.1.1).

Concrete Curing

Stramit Condeck HP[®] composite slabs require the same degree of curing as a conventional reinforced concrete slab. Follow the guidelines within AS3610.

Prop Removal

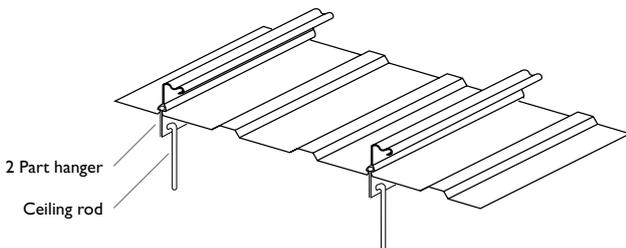
Temporary propping must not be removed until the slab has cured sufficiently. Prop removal procedure should be in accordance with AS3610.

Suspension Hangers

Stramit Condeck HP[®] decking has provision for suspended ceiling installation or support of building services. A two part hanger bracket is simply inserted into the underside of any rib and held in place by the suspension rod.

The ceiling hanger is capable of supporting a load of 2.5kN, and can be inserted at any time before or after the concrete pour.

NB: Ceiling hanger performance is dependent on concrete being in place. Performance of the ceiling hanger, loaded BEFORE the concrete pour is significantly less. Provided additional side lap fasteners are installed through the vertical web of the ribs – at no more than 500mm centres either side of the hanger, capacity of the hanger is reduced to 0.6kN.



Proprietary post-casting anchors may also be used with **Stramit Condeck HP**[®] decking for suspended services.

Additional Information

Technical Assistance

Stramit has experienced engineers and technical staff in each region. For assistance with design issues, composite decking applications and practical advice, contact your regional Technical Services Manager. Alternatively, ring your nearest Stramit location and say you have a technical enquiry regarding **Stramit Condeck HP**[®] decking.

Further Information

As well as our standard range of Technical Manuals, Installation Leaflets, Case Studies and other promotional literature Stramit has a series of Guides to aid design.

These include:

- Concealed Fixed Decking
- Roof Slope Guide
- Foot Traffic Guide
- Bullnosing, Curving and Crimping
- Acoustic Panels
- Cyclonic Areas
- Spring Curving Guide

Please contact your nearest Stramit location for any of these guides, other literature, or the composite slab design CD-ROM **Stramit Condeck HP**[®] **Slab Designer**[™] 2.3

Other Products

Stramit offers a wide range of building products, including:

- Purlins and girts
- Roof and wall sheeting
- Lightweight structural sections
- Truss components
- Gutters and downpipes
- Fascias
- Custom flashings
- Insulating products
- Fasteners

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