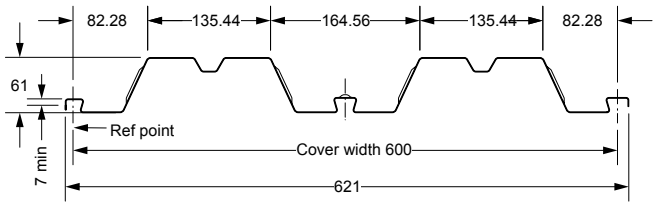
Concrete Saver-60 0.95 t Composite Slab Design Information

(Uses 4% less concrete than regular profiles)



Note :- The height of the neutral axis is taken from the underside of the steel deck.

Concrete Saver-60 *Composite Properties per metre width of slab*								t = 0.95 mm	Table 14
Modular Ratio	Slab Depth	Composite Slab Weight	Moment Capacity	Effective Depth					Ic + Iuc/2
n	D	q2	Mcs	ds	jd	a	Ic	Iuc	Ina
n	mm	kPa	kNm	mm	mm	mm	10^6 x mm^4	10^6 x mm^4	10^6 x mm^4
10	110	1.93	44.92	79.65	61.73	35.84	5.12	9.64	7.38
	120	2.16	50.56	89.65	69.48	40.34	6.51	11.83	9.17
	130	2.50	56.20	99.65	77.23	44.84	8.11	15.71	11.91
	140	2.73	61.84	109.65	84.98	49.34	9.94	19.56	14.75
	150	2.96	67.48	119.65	92.73	53.84	12.00	24.04	18.02
	160	3.42	74.74	129.65	102.70	53.91	14.30	29.17	21.73
	180	3.88	89.29	149.65	122.70	53.91	19.64	41.64	30.64
	200	4.34	103.85	169.65	142.70	53.91	26.02	57.36	41.69
18	110	1.93	44.92	79.65	61.73	35.84	4.18	6.20	5.19
	120	2.16	50.56	89.65	69.48	40.34	5.31	7.94	6.63
	130	2.50	56.20	99.65	77.23	44.84	6.62	10.00	8.31
	140	2.73	61.84	109.65	84.98	49.34	8.12	12.41	10.27
	150	2.96	67.48	119.65	92.73	53.84	9.82	15.19	12.51
	160	3.42	74.74	129.65	102.70	53.91	11.71	18.38	15.04
	180	3.88	89.29	149.65	122.70	53.91	16.13	26.06	21.09
	200	4.34	103.85	169.65	142.70	53.91	21.39	35.68	28.54

CORROSION PROTECTION

All composite steel concrete floor systems, in which the steel provides the positive tensile reinforcement, must be protected whenever corrosion or similar influences on the steel could lead to a reduction of it's structural performance.

Tray-dec products are made from high strength galvanised steel coil with a zinc coating mass of 275 g/m^2.

Additional corrosion protection need only be considered for the exposed (bottom) side of the steel trays.

The interface between steel and concrete (top side of the steel tray) is not subject to attack.

Hot dip galvanised coatings on steel consist of zinc iron alloy layers with a thin layer of relatively pure zinc.

When immersed in wet concrete, the zinc is etched by the alkaline concrete, forming a layer of insoluble zinc salts.

The zinc iron alloy layer is not attacked by the wet concrete and remains intact, protecting the steel from corrosion. The service life of this side of the deck should be equal to that of the concrete slab itself.

The exposed underside of the steel tray may need an additional protective coating when circumstances warrant this. In dry interior spaces, the zinc coating may provide an adequate service life. Adequate subfloor ventilation must be provided, with the underside of the trays elevated at least 450 mm above bare ground, to minimise corrosion risk. Where trays are in direct contact with unseasoned timber, it is necessary to protect the zinc coating with a moisture barrier, eg. bituminous paint or bituminous damp course, before replacement.

STORAGE

Before concrete is poured on to the trays, it is important that the trays are inspected for damage to the zinc coating caused during storage or installation and such damage made good.

If the trays have to be stored on site for any length of time, they should be stacked clear of the ground with a fall for drainage and protected by water proof covers which leave space between cover and trays to allow free circulation of air.

If conditions are such that corrosion could be expected on the exposed surface of the steel trays, an appropriate protective coating must be applied in accordance with the coating manufacturer's instructions. This will normally include cleaning the steel and applying a primer and two coats of paint. The required service life of the floor can be assured by subsequent regular inspections of the underside of the trays and proper maintenance procedures as recommended by the coating manufacturer.
The cost saving factor with Tray-dec 300 when coating becomes necessary is that competitive systems with a trapezoid'al profile have approximately 20% more surface area to be coated per square metre of effective floor area.

CONCRETE SAVER-60 is the latest generation in high tech composite steel decking that allows for both shallower and longer non reinforced spans. Because this steel deck has no extra height, due to the profile intrusions, the total slab height can be less resulting in smaller concrete volumes less stress cracks and smaller loads being carried by the rest of the structure.
Designs are in accordance with BS 5950 Part 4 & 6.

CONSTRUCTION TABLE PARAMETERS

The maximum allowable deflection is a function of L/130 with a maximum of 30 mm. This is with ponding taken into account.
Bending and crushing is calculated for the steel deck and has a limit of 1.5 applied.
The additional information in the construction table is included to give the design engineer a feel for span verses deflection.
Spans shown assume a clear span + 100 mm.

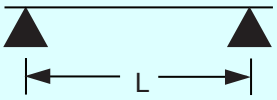
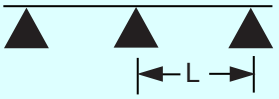
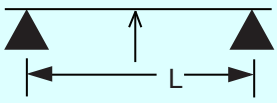
COMPOSITE TABLE PARAMETERS

The maximum values of span in the composite table are derived from the weight of the live plus dead load deflection. The resulting deflection is limited to Span/300.

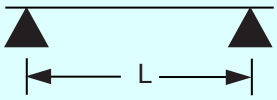
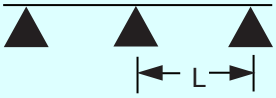
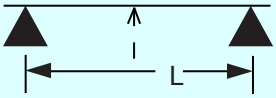
The bending moment does not exceed the bending moment capacity.

The span ratios when either n = 10 or n = 18 must not exceed 30 to 1 for single spans and 35 to 1 for either multiple, and single propped spans.

Concrete Saver-60 Construction tables — **t = 0.95** — Table 15

Span (n10) Clear span + 100 mm	props	Slab Depth (mm)	Max Span (m)	Max Defl (mm)	Span (m)	Defl (mm)	Span (m)	Defl (mm)	Span (m)	Defl (mm)	Limit B&C 1.5	Span Ratio	L/130 (mm)
Single span 		110	3.30	21	3.27	20	2.75	10	2.30	5		30.0	25
		120	3.50	29	3.20	20	2.72	10	2.25	5		29.2	27
		130	3.40	28	3.12	20	2.65	10	2.20	5		26.2	26
		140	3.30	27	3.06	20	2.60	10	2.15	5		23.6	25
		150	3.30	29	3.00	20	2.55	10	2.10	5		22.0	25
		160	3.25	29	2.95	20	2.50	10	2.09	5		20.3	25
		180	3.15	29	2.85	20	2.43	10	2.03	5		17.5	24
		200	3.00	27	2.80	20	2.37	10	2.00	5		15.0	23
Multiple span 		110	3.85	16	3.85	16	3.40	10	2.85	5	1.19	35.0	30
		120	4.20	25	3.95	20	3.35	10	2.85	5	1.46	35.0	32
		130	4.20	28	3.90	20	3.30	10	2.80	5	1.55	32.3	32
		140	4.00	25	3.82	20	3.25	10	2.75	5	1.51	28.6	31
		150	3.90	24	3.75	20	3.15	10	2.70	5	1.52	26.0	30
		160	3.70	21	3.65	20	3.10	10	2.65	5	1.47	23.1	28
		180	3.50	19	3.57	20	3.00	10	2.58	5	1.47	19.4	27
		200	3.40	19	3.45	20	2.95	10	2.50	5	1.53	17.0	26
Single span (propped) 	1	110	3.90	1							0.51	35.5	30
	1	120	4.20	2							0.60	35.0	16
	1	130	4.50	2							0.71	34.6	17
	1	140	4.90	4							0.85	35.0	19
	1	150	5.30	5							1.00	35.3	20
	1	160	5.60	7							1.14	35.0	22
	1	180	6.30	13							1.50	35.0	24
	1	200	6.70	19							1.80	33.5	26

**Clear span + 100mm*

Concrete Saver-60 Composite Span Tables										t = 0.95		Table 16	
Support Condition	Slab Depth (mm)	30 Mpa concrete n=10 Imposed Load (kPa) 0 m	3.5 m	5 m	10 m	30 Mpa concrete n=18 Imposed Load (kPa) 0 m	3.5 m	5 m	10 m	BM kNm	L/300	n=10 Span Ratio	n=18 Span Ratio
Single span 	110	3.30	3.30	3.30	2.80	3.30	3.30	3.30	2.80	17.3	11.0	30.0	30.0
	120	3.50	3.50	3.50	3.10	3.50	3.50	3.50	3.00	21.6	11.7	29.2	29.2
	130	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	26.3	11.3	26.2	26.2
	140	3.30	3.30	3.30	3.30	3.40	3.30	3.30	3.30	25.2	11.0	23.6	24.3
	150	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	25.5	11.0	22.0	22.0
	160	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	25.1	10.8	20.3	20.3
	180	3.15	3.15	3.16	3.15	3.15	3.15	3.15	3.15	24.3	10.5	17.5	17.5
	200	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	22.6	10.0	15.0	15.0
Multiple span 	110	3.85	3.85	3.70	2.80	3.85	3.85	3.70	2.80	17.4	12.8	35.0	35.0
	120	4.20	4.20	4.20	3.10	4.20	4.20	4.20	3.10	21.7	14.0	35.0	35.0
	130	4.20	4.20	4.20	3.50	4.20	4.20	4.20	3.50	28.0	14.0	32.3	32.3
	140	4.00	4.00	4.00	3.80	4.00	4.00	4.00	3.80	33.5	13.3	28.6	28.6
	150	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	35.8	13.0	26.0	26.0
	160	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	32.6	12.3	23.1	23.1
	180	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	30.0	11.7	19.4	19.4
	200	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	29.1	11.3	17.0	17.0
Single span (props removed) 	110	3.90	3.90	3.60	2.80	3.90	3.80	3.70	2.80	17.4	13.0	35.5	35.5
	120	4.20	4.20	3.90	3.10	4.40	4.00	3.90	3.10	21.7	14.0	35.0	36.7
	130	4.50	4.50	4.30	3.50	4.60	4.50	4.10	3.50	28.1	15.0	34.6	35.4
	140	4.90	4.80	4.80	3.80	4.80	4.40	4.30	3.80	33.7	16.3	35.0	34.3
	150	5.30	5.20	5.20	4.10	5.00	4.60	4.50	4.10	39.9	17.7	35.3	33.3
	160	5.60	5.50	5.40	4.30	5.20	4.80	4.70	4.30	44.6	18.7	35.0	32.5
	180	6.20	5.90	5.80	4.70	5.50	5.20	5.10	4.70	55.0	20.7	34.4	30.6
	200	6.70	6.30	6.20	4.70	5.90	5.60	5.50	4.70	56.6	22.3	33.5	29.5

* clear span +100 mm

USING THE CONSTRUCTION & COMPOSITE SPAN TABLES

Both the single span and the multiple span sections of this table are controlled by the span to depth ratio, the span/130 ratio and the calculated deflections.
The multiple span and single span propped section is further controlled by a bending and crushing limit of 1.5.

The single span and multiple span sections provide both a value for the maximum possible span as well as spans of lower deflections.

The single span propped section is controlled by all of the above as well as inputs from the composite span tables. The live loads as indicated in red at the base of this table only apply to the single span propped section. Were the imposed load is 0 the result represents the dead load of the composite slab.

All strength calculations in the Composite Span tables are based on 30 MPa concrete.

The values of span in this section are further influenced by the deflections imposed by the weight of live load plus dead load. The allowable deflection is a function of span/300.

A further restraint is the bending moment.
The calculated bending moment must not exceed moment capacity the values of which are shown in the appropriate 'Composite Properties Tables'

To assist a designer in calculations of deflection, due to long term loading, properties of the composite slab using a modular ratio of 18 are shown along side the modular ratio of 10.

Deflection calculations in the composite tables are based on a modular ratio of 10.

The composite span tables do not allow for permanent loads like services, ceilings, finishes and partitions.