DELTACORE FLOOR MANUAL

The **biggest name** in precast
concrete has just five letters.

DELTA CORPORATION LIMITED
THE STRENGTH

D elta Corporation have been supplying its **Deltacore** range of prestressed floor planks to the WA construction market for over 20 years and in SA for over 11 years. It has become the precast floor product of choice for many builders.

E veryone wants to save time and money. With the speed of precast and the strength of prestressing, by using **Deltacore** you can. It's even capable of spanning up to 17m under normal loading conditions.

L ike everything we produce at Delta, **Deltacore** can be tailored to suit your project. Ranging from 150 to 400mm thick with a standard width of 1200mm, Deltacore is a versatile flooring system.

T he service from Delta's highly experienced team is second to none with state of the art production facilities capable of producing large quantities of **Deltacore** providing installation rates of up to 1,000m^2 per day.

A ll this plus the backing of one of Australia's leading precast concrete manufacturers will be an advantage on your next project. Contact us to explore the options with **Deltacore** on (08) 9296 5000

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Preamble

This Technical Manual has been prepared by Delta Corporation Limited to facilitate the design of suspended concrete slabs covering a wide range of applications using the **Deltacore** Floor Planks. The procedures are based on established design methods and material properties for prestressed suspended flooring systems. Design criteria relating to bending, shear capacity, anchoring of reinforcement, transverse reinforcement, support conditions and any general design and construction procedures shall be referred to and approved by an industry registered structural design engineer.

Delta Corporation Limited is a wholly owned subsidiary of Schaffer Corporation Limited
ACN 008 67

Delta Corporation Limited
218 Campersic Road
HERNE HILL WA 6056
ABN 66 009 225 567

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Deltacore Floor Manual

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Introduction

Deltacore floor planks are precast, prestressed elements produced on a long-line bed using an extrusion machine. Planks are nominally 1200mm wide modules, thicknesses range from 150mm to 400mm.

The casting bed length is 120m and made of steel. The beds are heated from underneath to shorten the curing cycle and ensure daily production. The planks are saw-cut on the bed to the required lengths for each project.

Typically an insitu concrete topping is often placed onsite to produce composite units and a level floor surface, but the planks can just as readily be used with grouted joints only.

Deltacore, as a flooring system, has many advantages over conventional and other flooring systems as follows:

- **Machine-Made in Factory**
  Deltacore is manufactured by using an extrusion machine in a controlled factory environment, cured, cut to length and stored ahead of the construction schedule ready for immediate delivery to the project.

- **Speed of Construction**
  Deltacore is rapidly installed with minimal labour and equipment reducing construction time, risk, site costs and financial costs.

- **Immediate Working Platform**
  Deltacore provides an immediate, safe working platform for following trades and can be designed to accommodate high construction loads.

- **Eliminates Formwork and Propping**
  Deltacore typically does not require propping during construction providing clear and unrestricted access immediately for following trades.

- **Reduced On-site Labour**
  A small erection crew can install up to 1,000m^2 of Deltacore per day.

- **Efficient, Lightweight Section**
  The hollow voids and prestressing result in reduced dead load for a given strength. The depth of plank and the strand pattern can be varied to suit the span and load requirements.

- **Design Flexibility**
  Deltacore can be used in combination with most building materials including masonry walls, precast or insitu concrete walls and beams, prestressed concrete or steel beams. Deltacore can accommodate most building requirements including openings, angles and cantilevers.

- **Durability** - Concrete used for the production of Deltacore satisfies the durability requirements of the AS 3600 with a minimum concrete strength of 60MPa.

- **Long Span -** Deltacore can accommodate long spans, resulting in column-free open spaces. Clear spans of up to 17 metres can be economically achieved.

- **High Load Capacity -** Deltacore planks are capable of handling the heavy loads required in shopping centres, car parks, offices, apartments, housing and warehouse structures at minimal floor depths. Some sections are able to be used as bridge members.

- **Fire Resistance -** Fire resistance levels satisfies regulatory requirements with no further treatment.

- **Sound Insulation -** Deltacore reduces the amount of transmitted noise and satisfies building code requirements.

- **Pre-Finished Ceilings -** Deltacore planks will readily accept a variety of applied finishes. Alternatively, the soffits can be directly lined or have a suspended ceiling.

- **Services -** The cores in the planks can be used as service ducts to conceal plumbing, electrical and telephone cables. Large openings are pre-cut at our factory whilst small penetrations can be cut on site.

- **Deltacore Floor Design Program** - This program allows engineers to verify spans, loading, flexural bending and shear capacity as well as deflections and much more.

For further information and a copy of the Deltacore Floor Design Program visit our website
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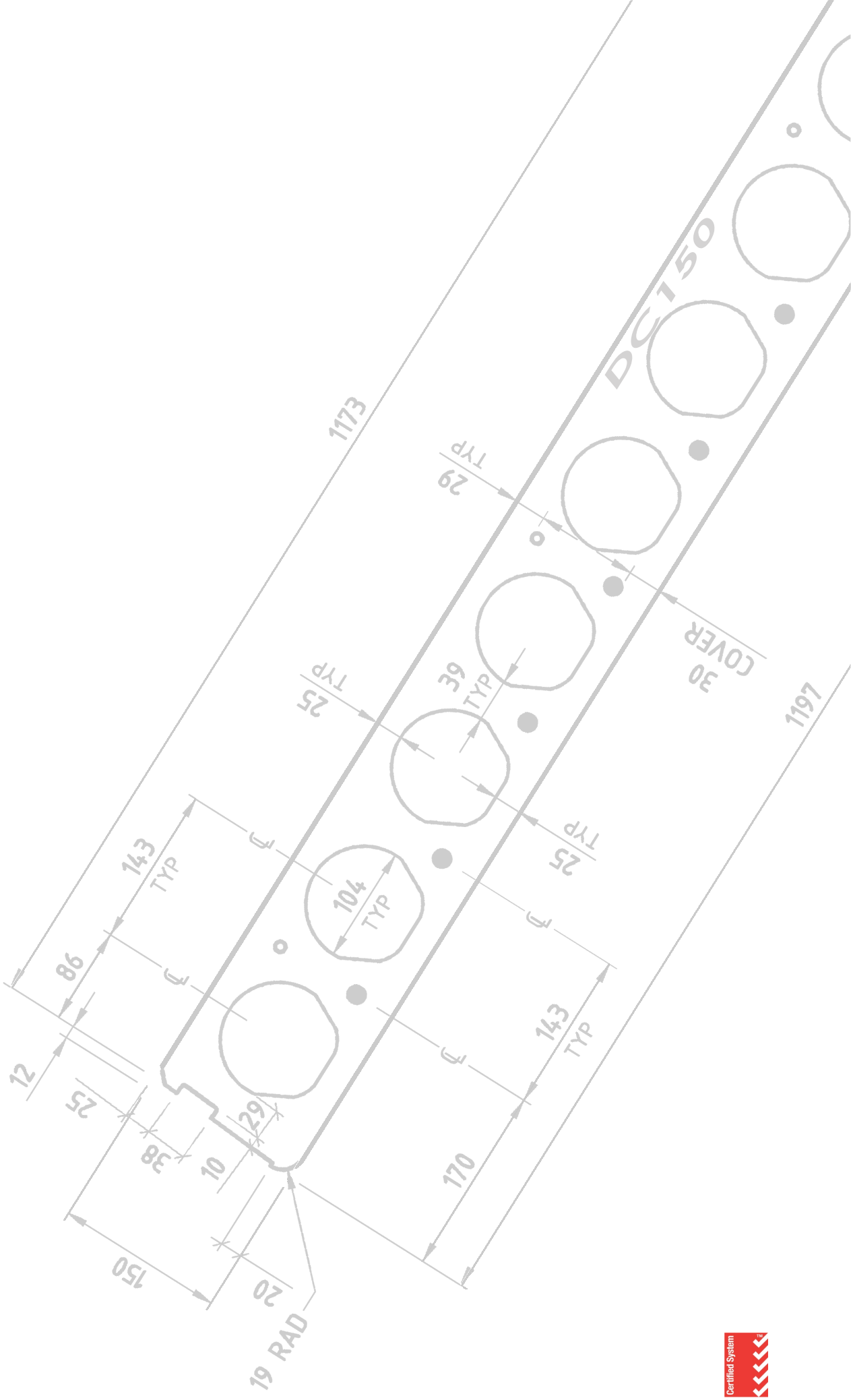

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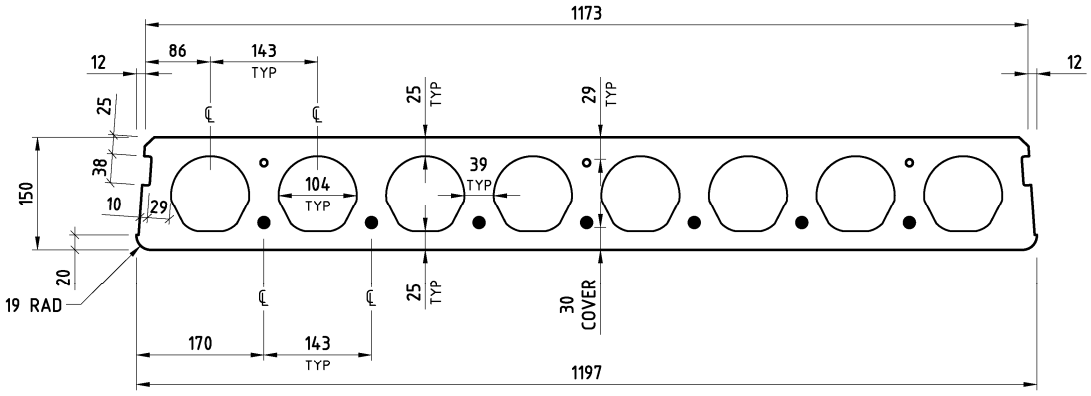
Deltacore 150

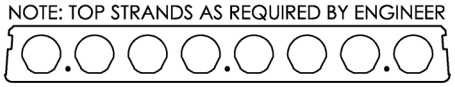
DC150 Technical Data



TYPICAL CROSS SECTION DIMENSIONS

PANEL PROPERTIES		
CROSS SECTIONAL AREA	0.110606 m²	
WEIGHT (kg) (S.G. 2500 kg/m³)	Lm	277
	m2	230
EFFECTIVE THICKNESS	93mm	
CONCRETE STRENGTH	60MPa	
STRAND SIZE & NUMBER	BOTTOM	TOP
STANDARD SIZES	9.3mm	9.3mm
MAXIMUM SIZES	12.7mm	9.3mm
MAXIMUM NUMBER	7	7
TOLERANCES		
LENGTH	+10 - 10mm	
WIDTH	+ 3 - 6mm	
THICKNESS	+ 3 - 3mm	
SQUARENESS OF END	+ 6 - 6mm	
LOCATION OF STRANDS	+ 3 - 3mm	
DIFFERENTIAL CAMBER ADJACENT UNITS	2mm/m but not greater than 15mm	
WIND	10mm/3000mm	

NOTE: TOP STRANDS AS REQUIRED BY ENGINEER



3 BTM. STRANDS

5 BTM. STRANDS

7 BTM. STRANDS

TYPICAL STRAND CONFIGURATIONS

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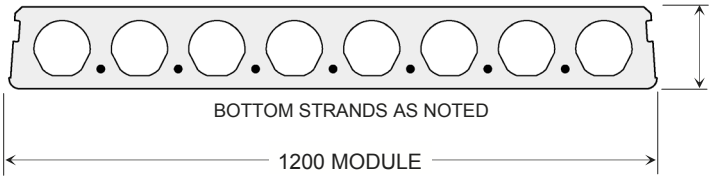
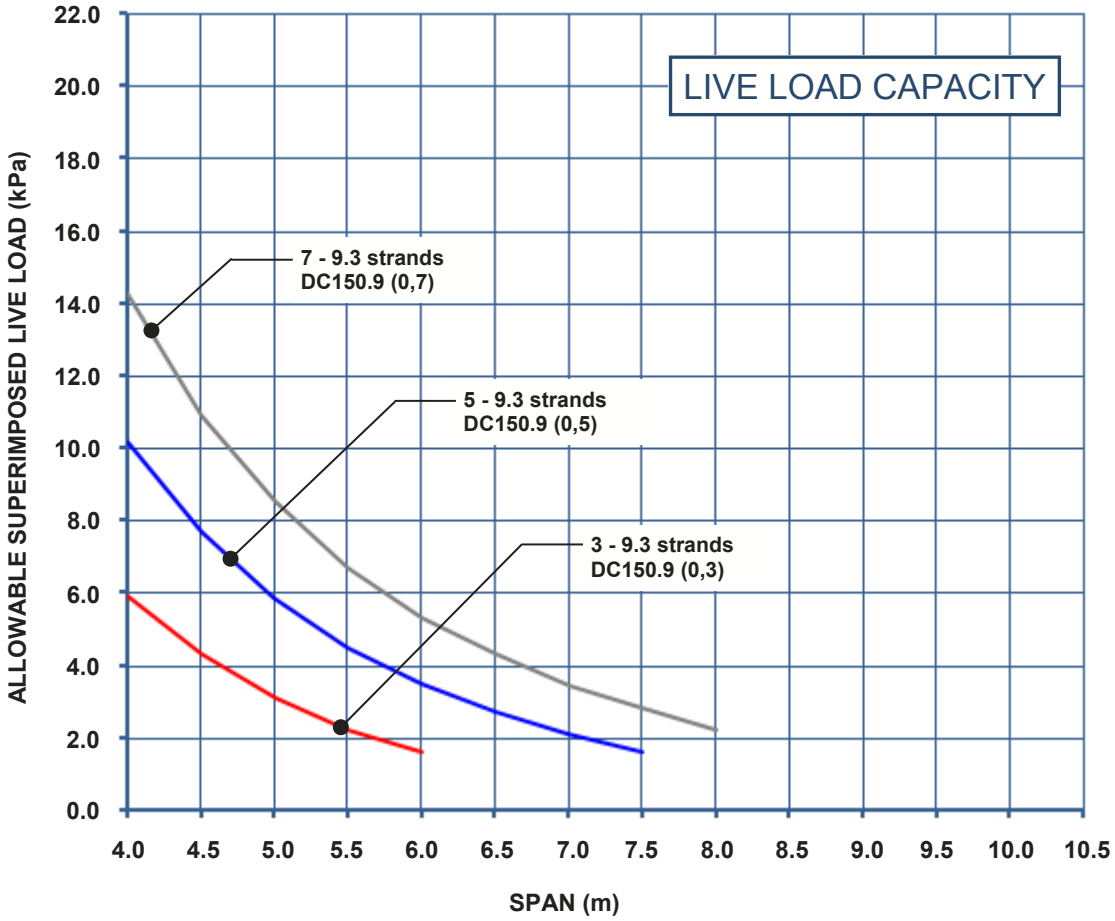
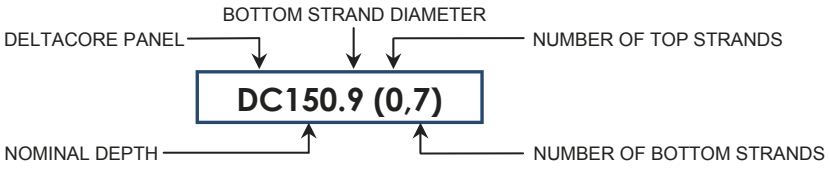
DC150 Live Load Capacity





NOTES:

1. Concrete Compressive Strength: Deltacore Planks - 60 MPa
2. All strands are stressed to 70% U.T.S.
3. Cover to bottom strands 30mm



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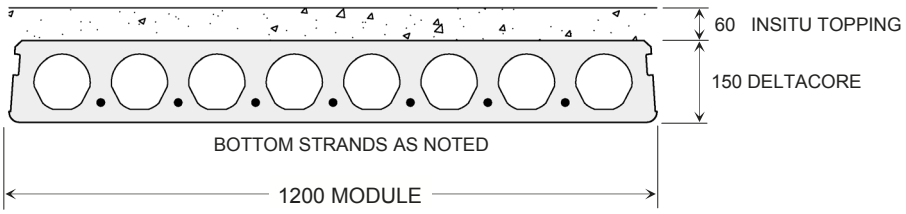
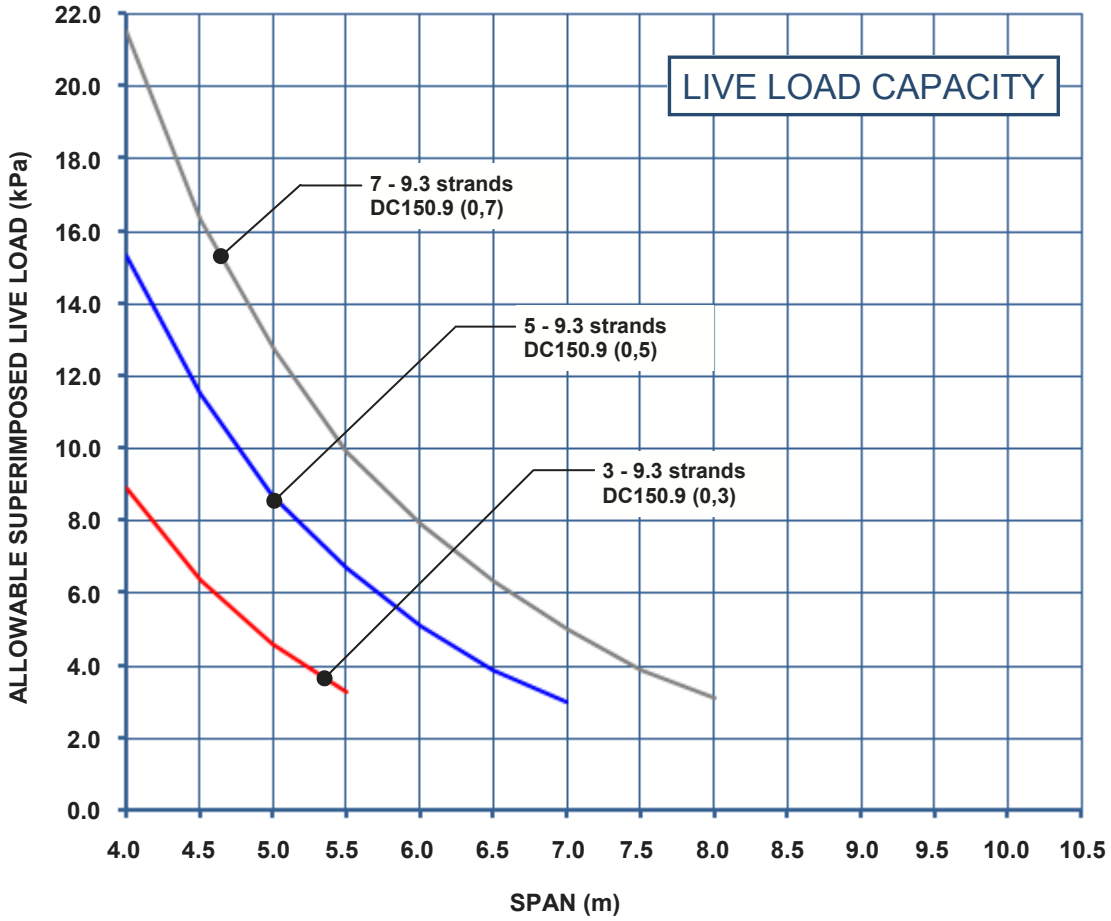
Deltacore 150

DC150 Topped Live Load Capacity





NOTES:

1. Concrete Compressive Strength: Deltacore Planks - 60 MPa; Insitu Topping Slab - 32MPa
2. All strands are stressed to 70% U.T.S.
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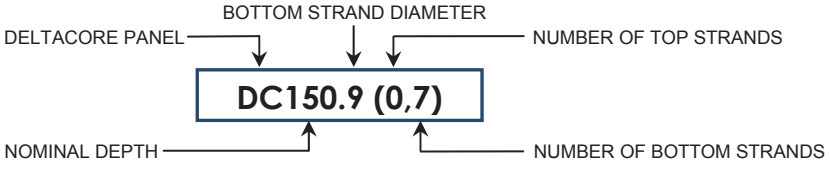

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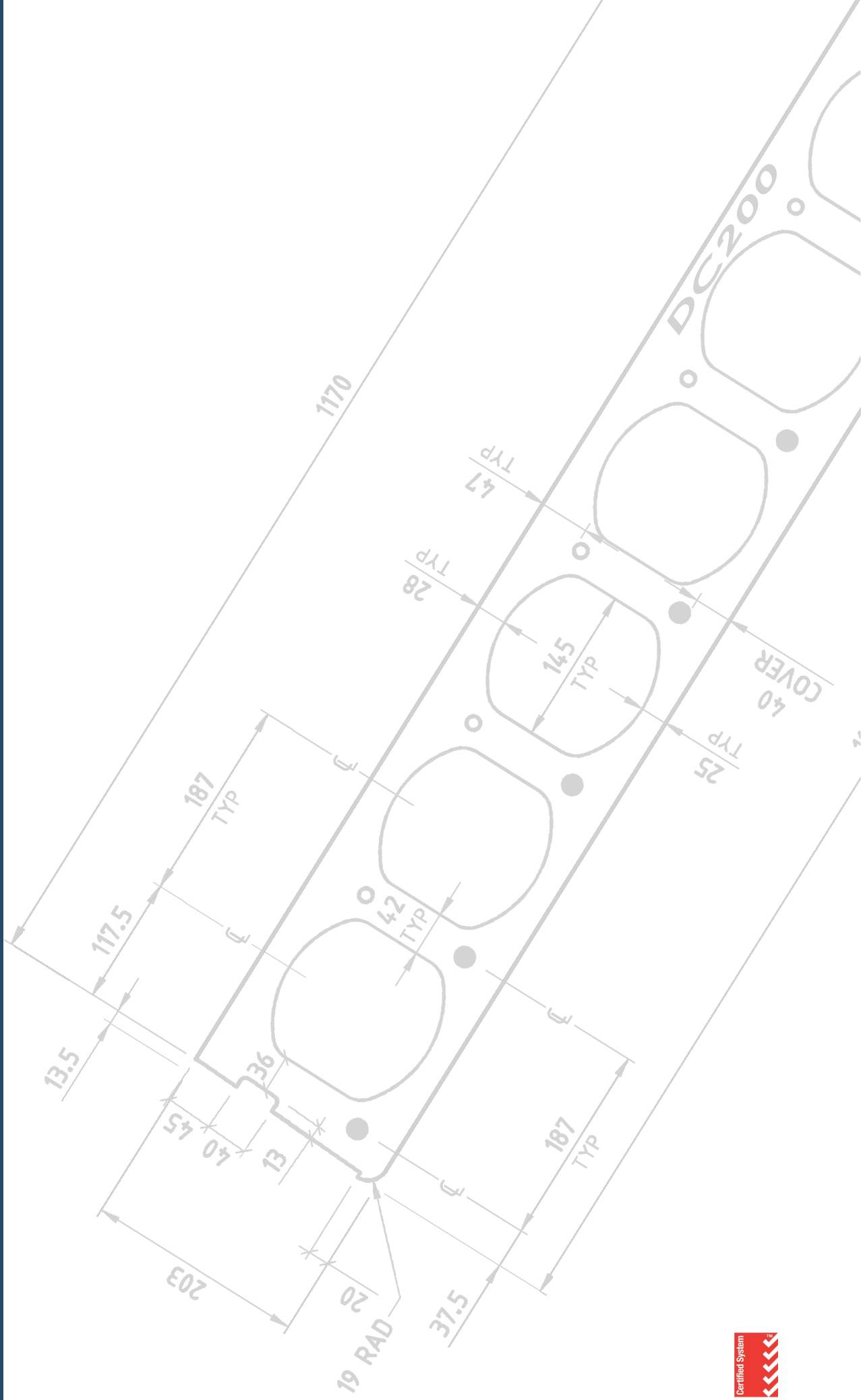

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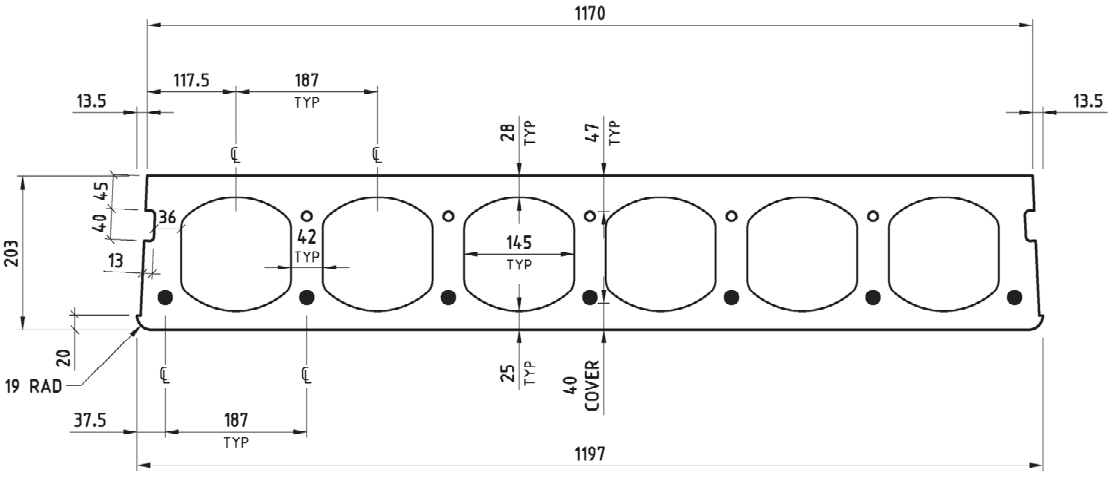
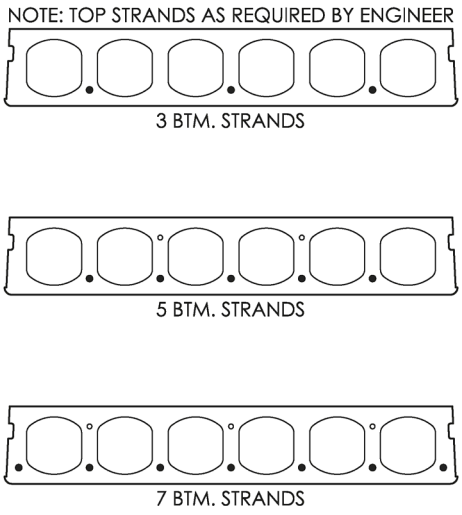
DC200 Technical Data



TYPICAL CROSS SECTION DIMENSIONS



TYPICAL STRAND CONFIGURATIONS

PANEL PROPERTIES		
CROSS SECTIONAL AREA	0.124655 m²	
WEIGHT (kg) (S.G. 2500 kg/m³)	Lm	312
	m2	260
EFFECTIVE THICKNESS	105mm	
CONCRETE STRENGTH	60MPa	
STRAND SIZE & NUMBER	BOTTOM	TOP
STANDARD SIZES	12.7mm	9.3mm
MAXIMUM SIZES	15.2mm	12.7mm
MAXIMUM NUMBER	7	5
TOLERANCES		
LENGTH	+10 - 10mm	
WIDTH	+ 3 - 6mm	
THICKNESS	+ 3 - 3mm	
SQUARENESS OF END	+ 6 - 6mm	
LOCATION OF STRANDS	+ 3 - 3mm	
DIFFERENTIAL CAMBER ADJACENT UNITS	2mm/m but not greater than 15mm	
WIND	10mm/3000mm	

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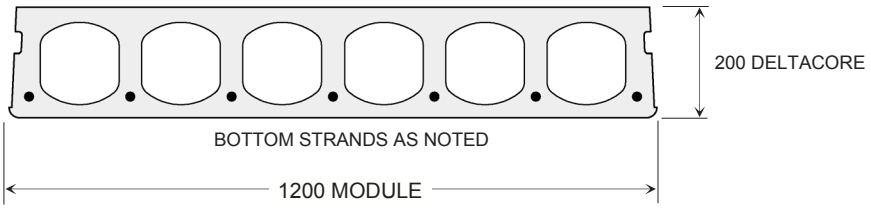
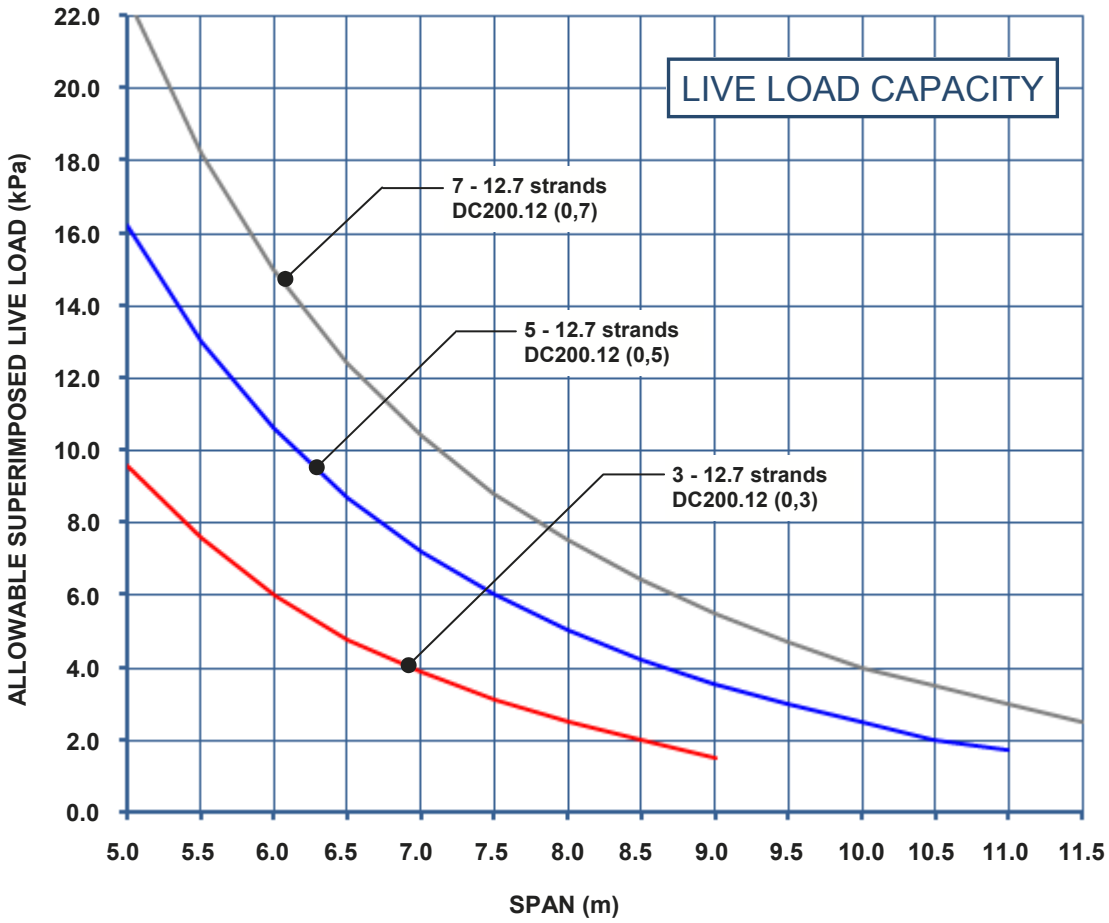
DC200 Live Load Capacity





NOTES:

1. Concrete Compressive Strength: Deltacore Planks - 60 MPa
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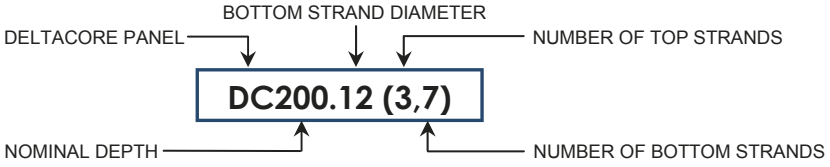

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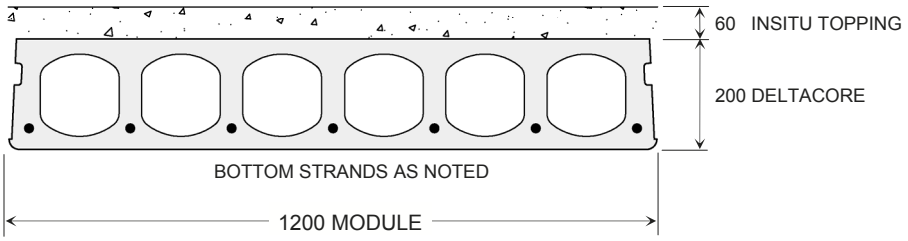
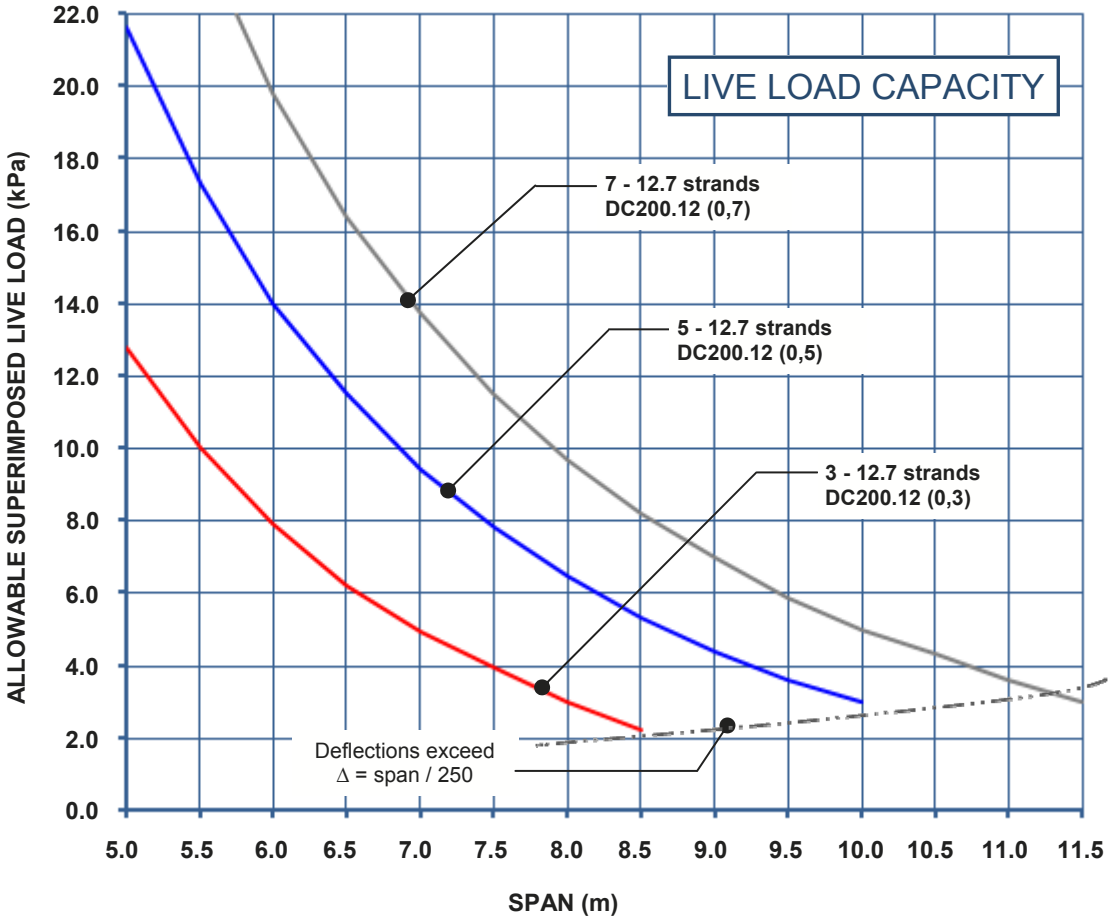
DC200 Topped Live Load Capacity





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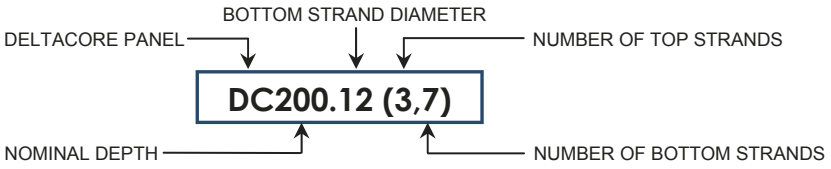

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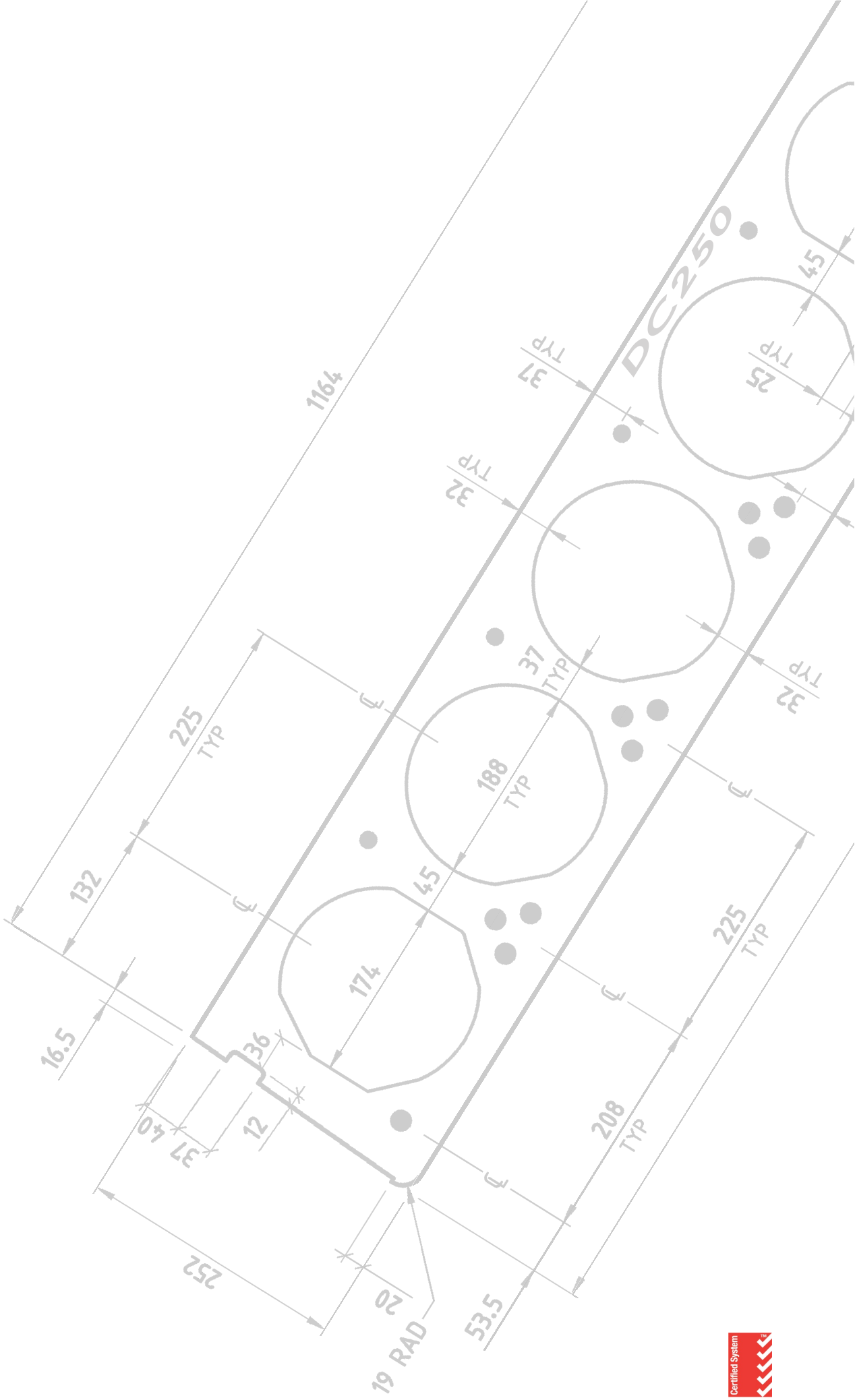

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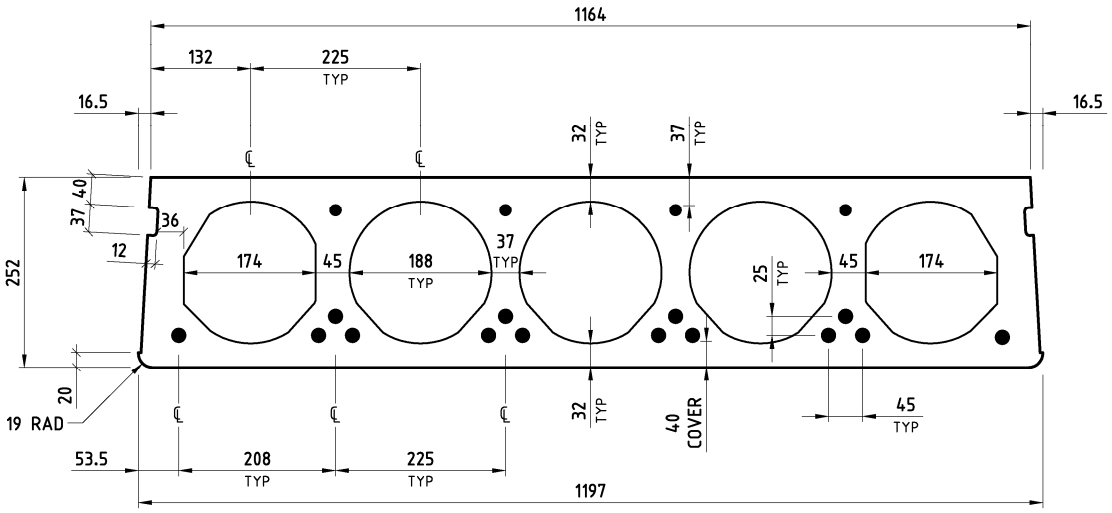
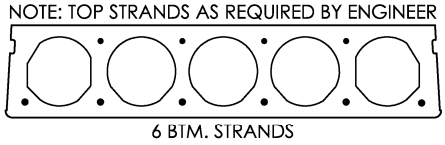
DC250 Technical Data

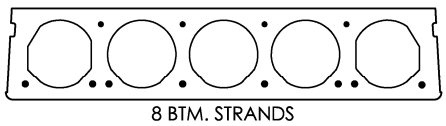


TYPICAL CROSS SECTION DIMENSIONS

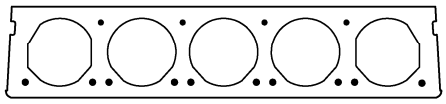
NOTE: TOP STRANDS AS REQUIRED BY ENGINEER



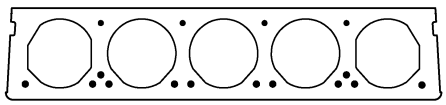
6 BTM. STRANDS



8 BTM. STRANDS



10 BTM. STRANDS



12 BTM. STRANDS

TYPICAL STRAND CONFIGURATIONS

PANEL PROPERTIES		
CROSS SECTIONAL AREA	0.160268 m²	
WEIGHT (kg) (S.G. 2500 kg/m³)	Lm	401
	m2	334
EFFECTIVE THICKNESS	136mm	
CONCRETE STRENGTH	60MPa	
STRAND SIZE & NUMBER	BOTTOM	TOP
STANDARD SIZES	12.7mm	9.3mm
MAXIMUM SIZES	15.2mm	12.7mm
MAXIMUM NUMBER	14	4
TOLERANCES		
LENGTH	+10 - 10mm	
WIDTH	+ 3 - 6mm	
THICKNESS	+ 3 - 3mm	
SQUARENESS OF END	+ 6 - 6mm	
LOCATION OF STRANDS	+ 3 - 3mm	
DIFFERENTIAL CAMBER ADJACENT UNITS	2mm/m but not greater than 15mm	
WIND	10mm/3000mm	

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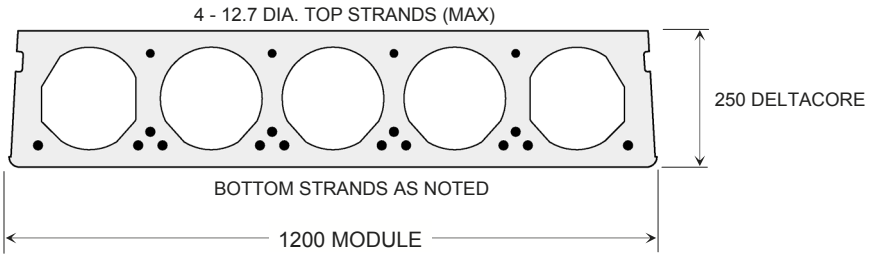
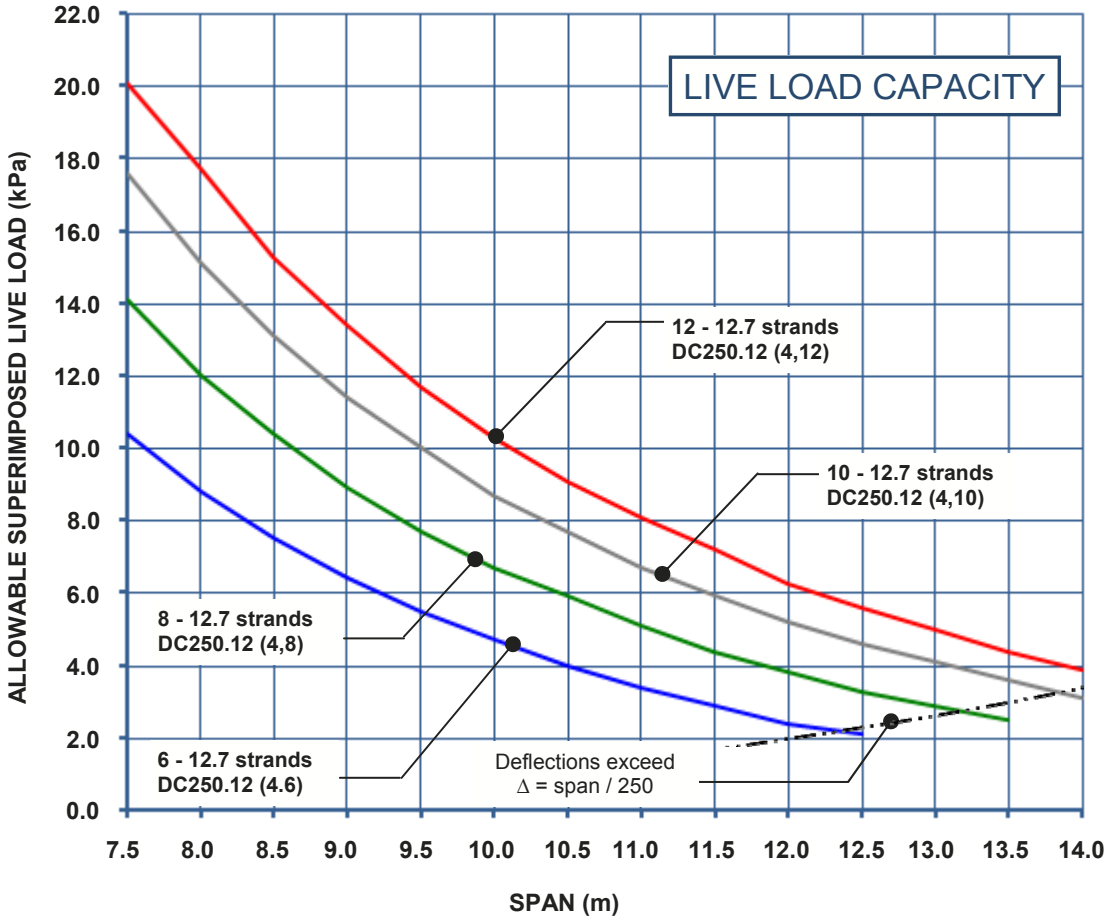
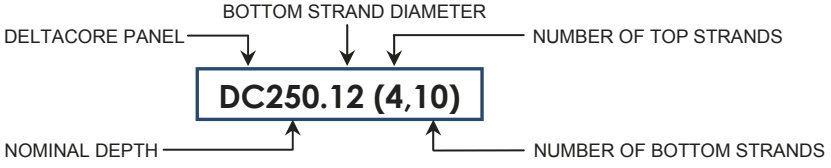
DC250 Live Load Capacity





NOTES:

1. Concrete Compressive Strength: Deltacore Planks - 60 MPa
2. All strands are stressed to 70% U.T.S.
3. Cover to bottom strands 40mm



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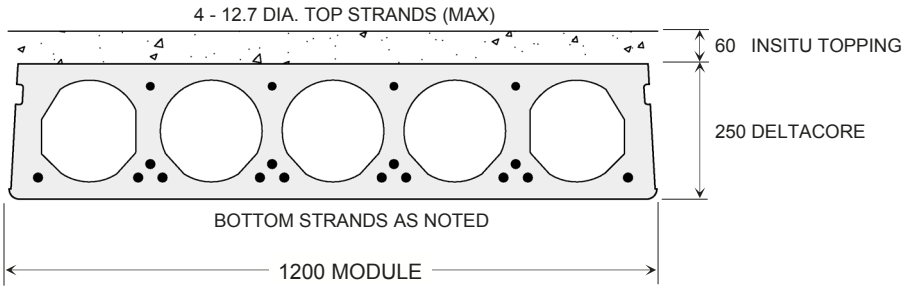
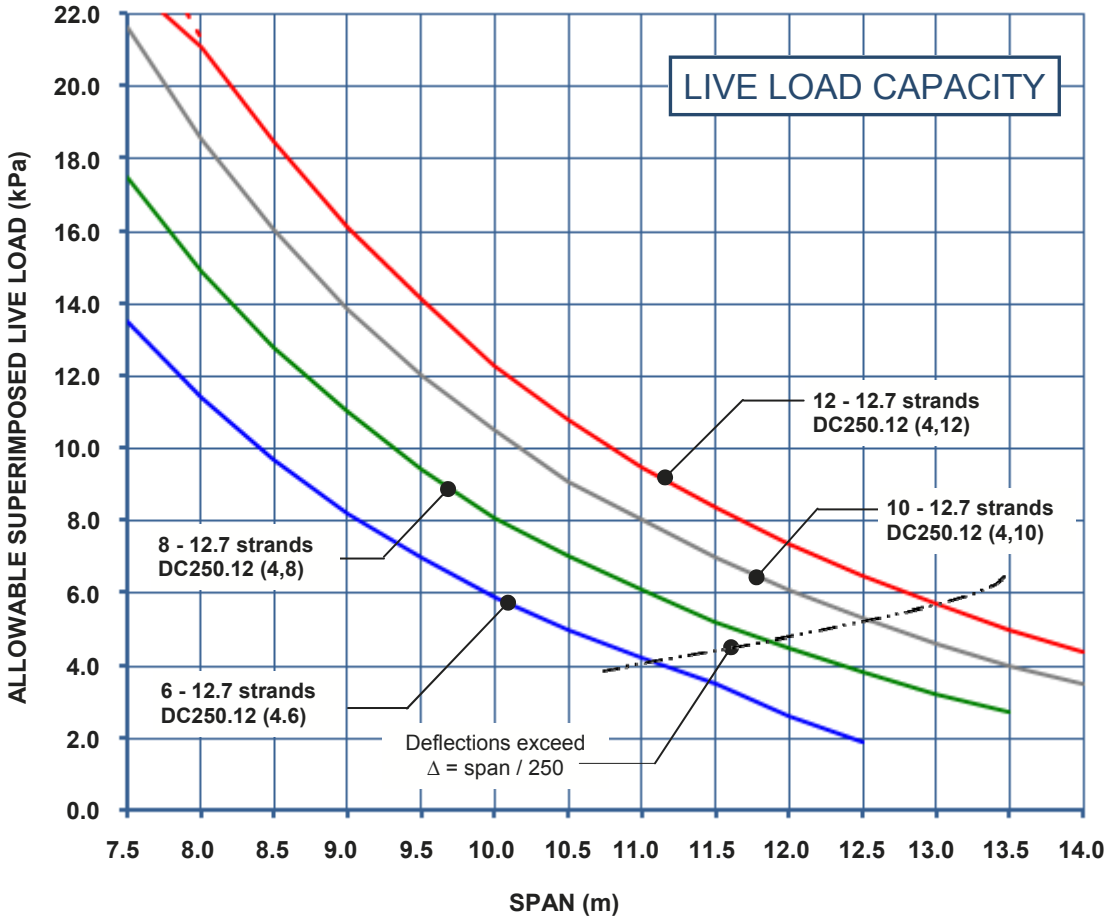
Deltacore 250

DC250 Topped Live Load Capacity





NOTES:

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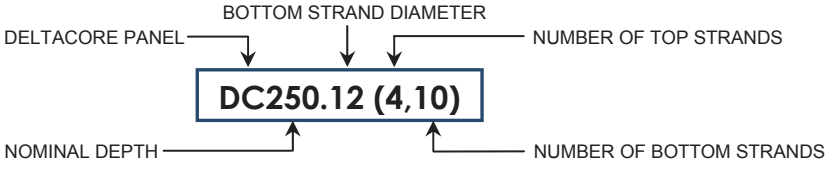

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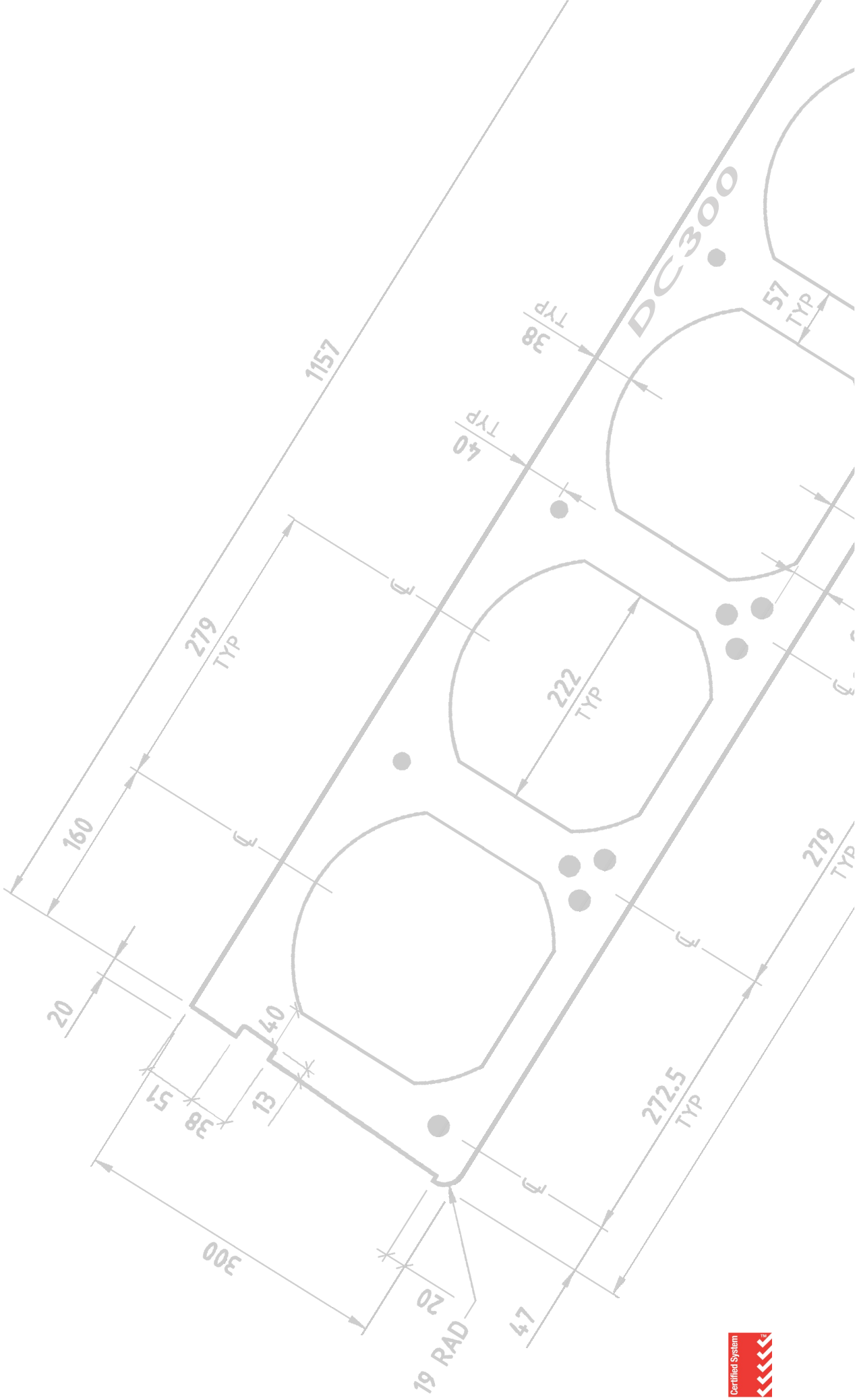

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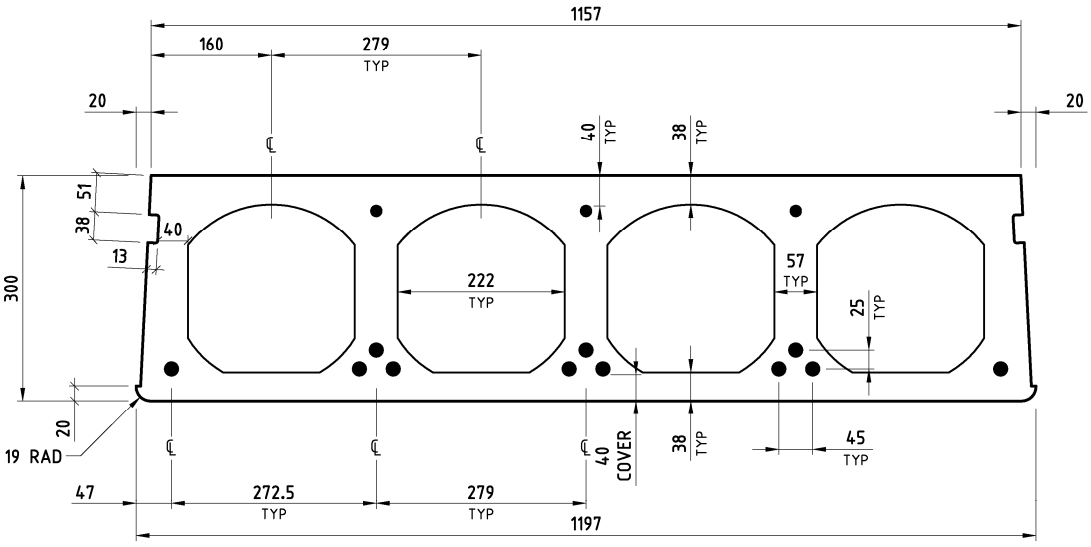
Deltacore 300

DC300 Technical Data



TYPICAL CROSS SECTION DIMENSIONS

8 BTM. & MIN. 3 TOP STRANDS

9 BTM. & MIN. 3 TOP STRANDS

10 BTM. & MIN. 3 TOP STRANDS

11 BTM. & MIN. 3 TOP STRANDS

TYPICAL STRAND CONFIGURATIONS

PANEL PROPERTIES		
CROSS SECTIONAL AREA	0.173333 m^2	
WEIGHT (kg) (S.G. 2500 kg/m^3)	Lm	433
	m2	361
EFFECTIVE THICKNESS	147mm	
CONCRETE STRENGTH	60MPa	
STRAND SIZE & NUMBER	BOTTOM	TOP
STANDARD SIZES	12.7mm	12.7mm
MAXIMUM SIZES	15.2mm	12.7mm
MAXIMUM NUMBER	11	3
TOLERANCES		
LENGTH	+10 - 10mm	
WIDTH	+ 3 - 6mm	
THICKNESS	+ 3 - 3mm	
SQUARENESS OF END	+ 6 - 6mm	
LOCATION OF STRANDS	+ 3 - 3mm	
DIFFERENTIAL CAMBER ADJACENT UNITS	2mm/m but not greater than 15mm	
WIND	10mm/3000mm	

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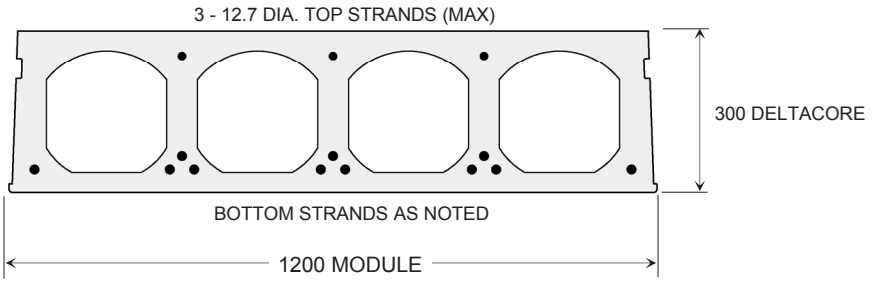
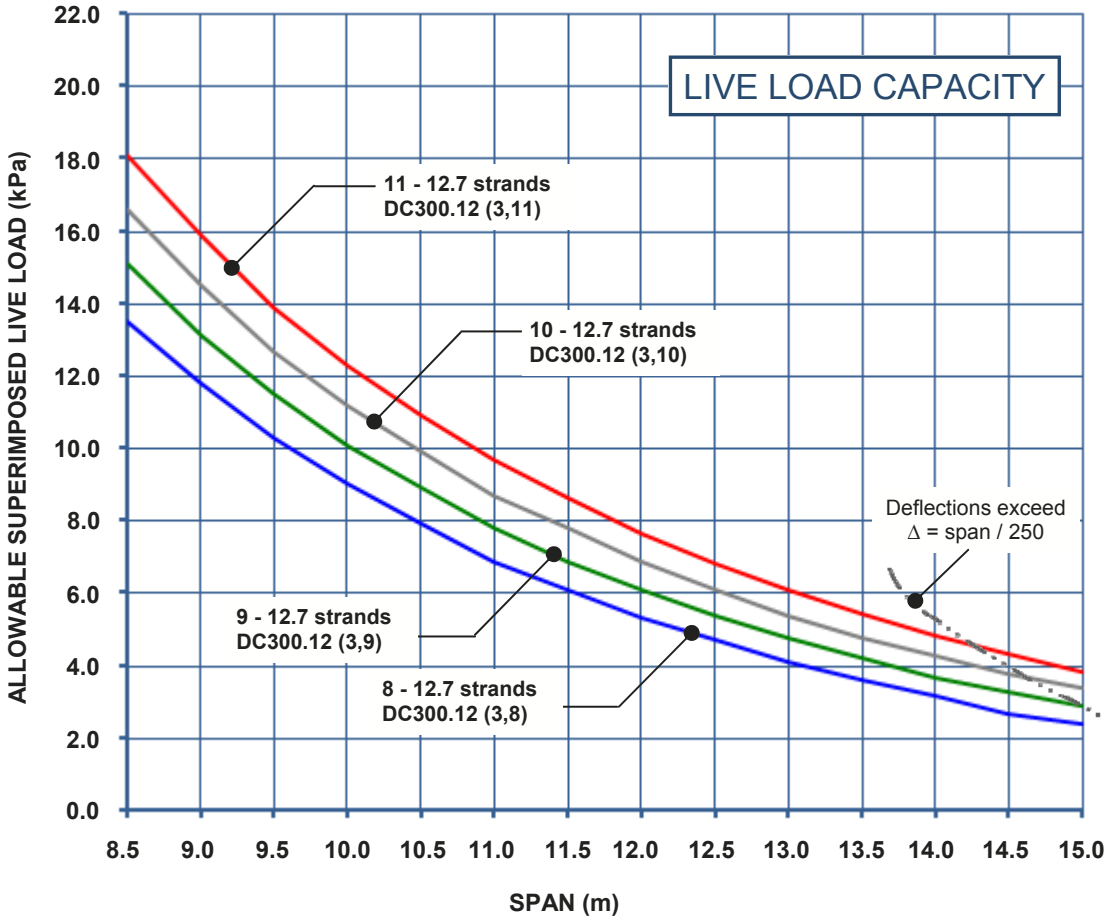
Deltacore 300

DC300 Live Load Capacity





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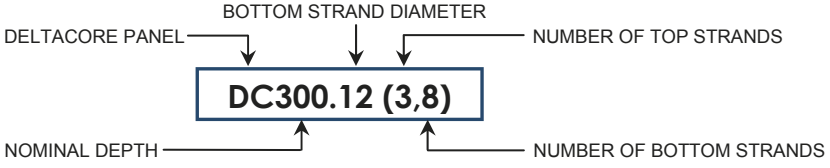

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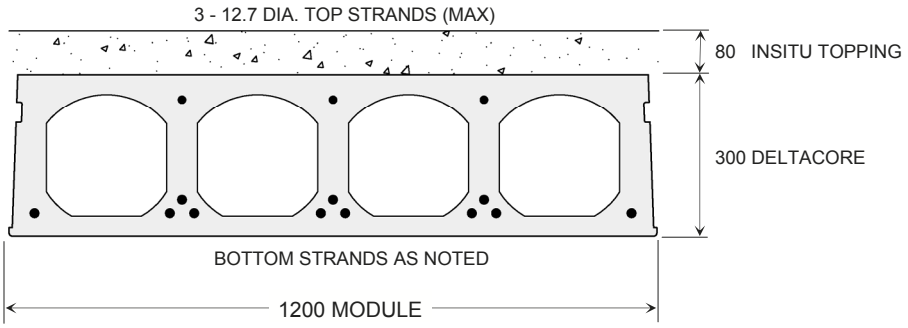
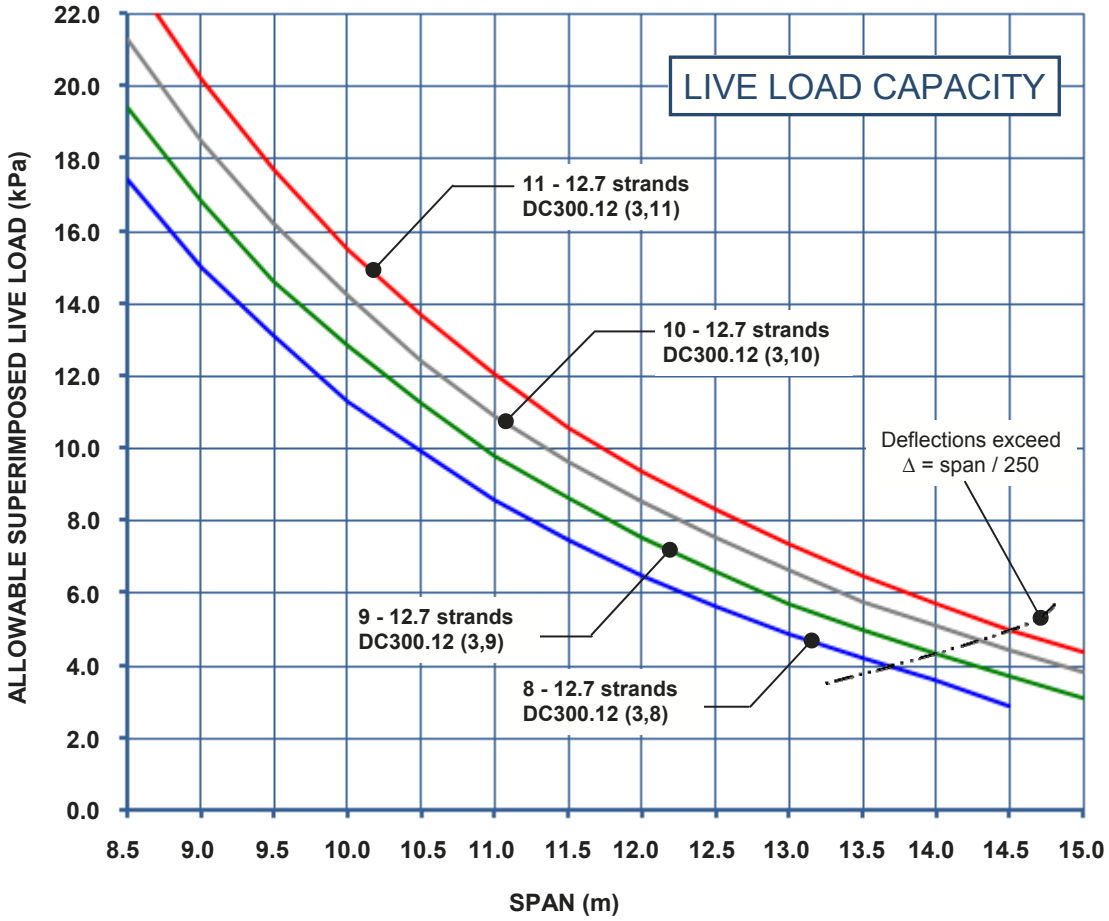
Deltacore 300

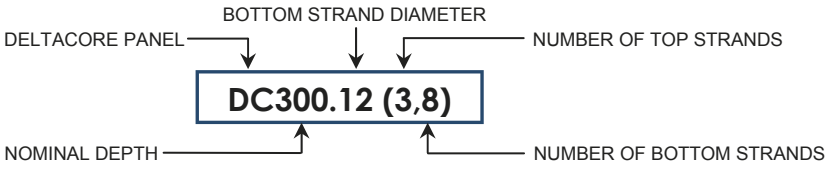
DC300 Topped Live Load Capacity





NOTES:

1. Concrete Compressive Strength: Deltacore Planks - 60 MPa; Insitu Topping Slab - 32MPa
2. All strands are stressed to 70% U.T.S.
3. Cover to bottom strands 40mm



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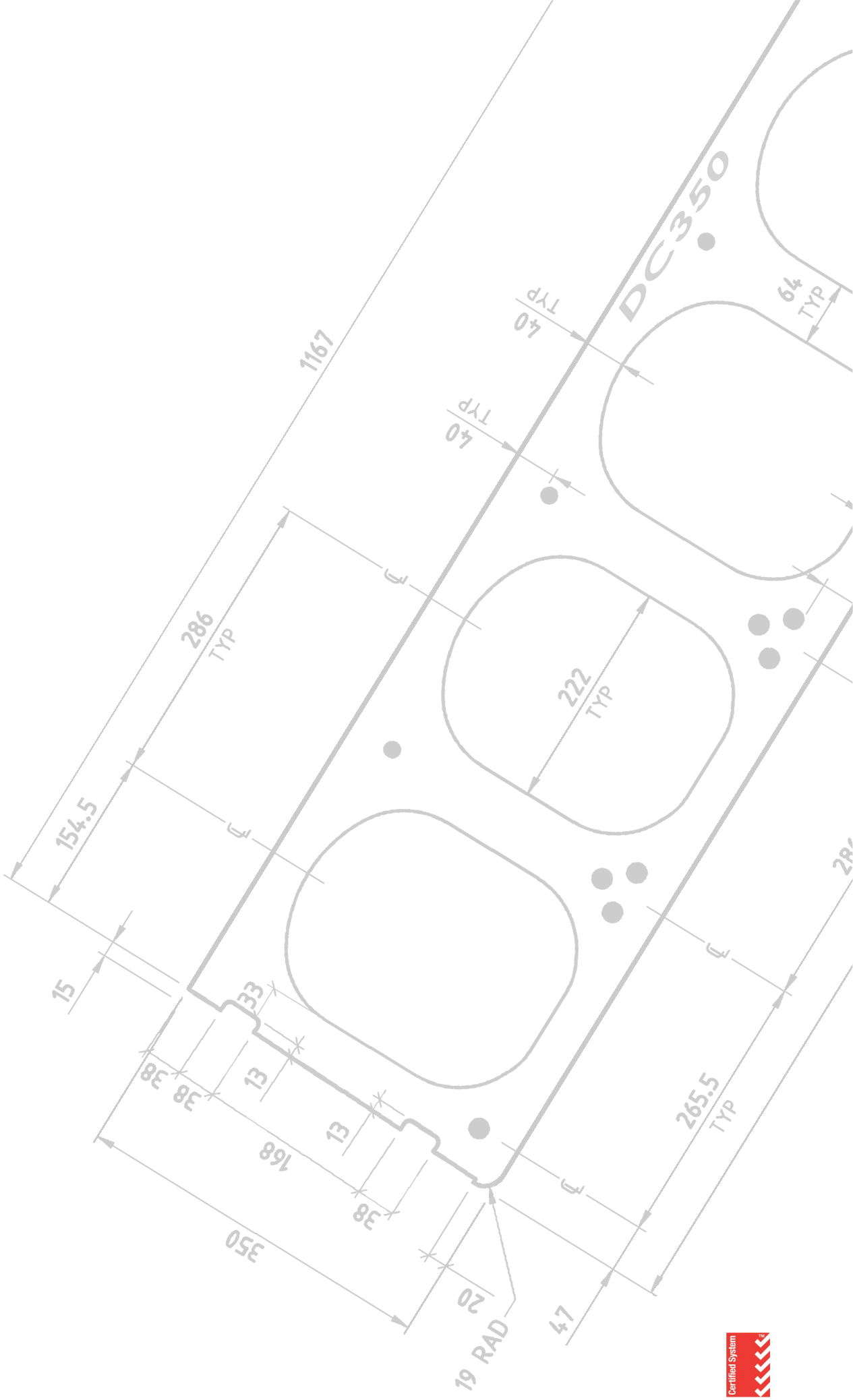
THE STRENGTH

Deltacore



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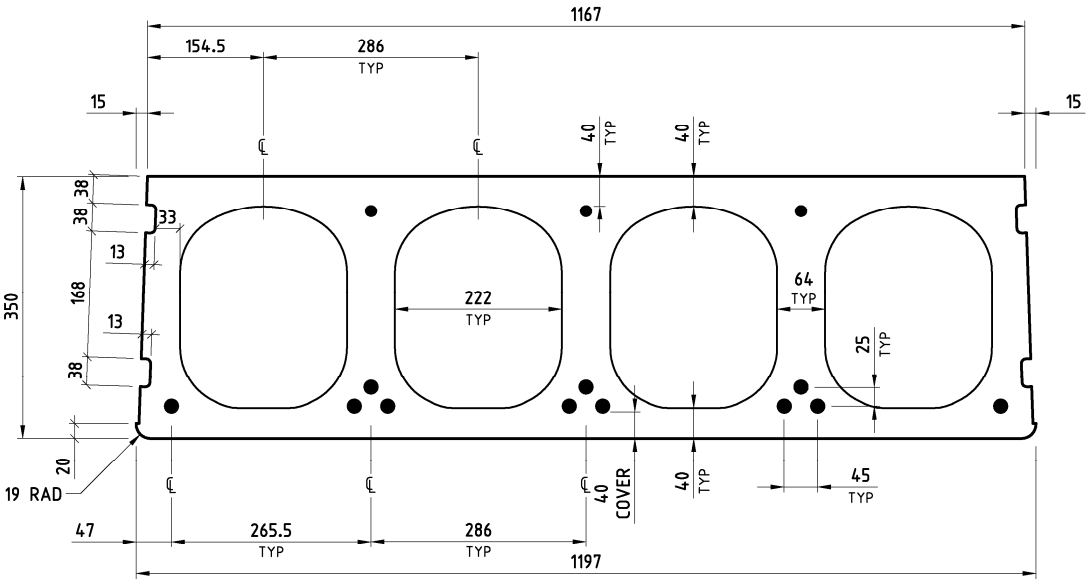
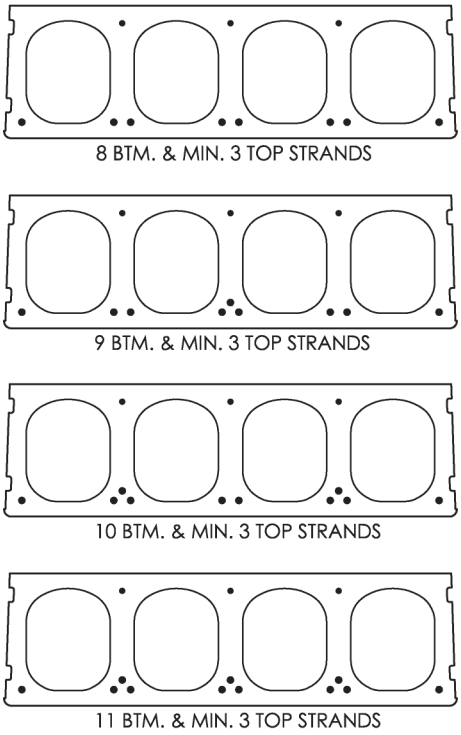
Deltacore 350

DC350 Technical Data



TYPICAL CROSS SECTION DIMENSIONS

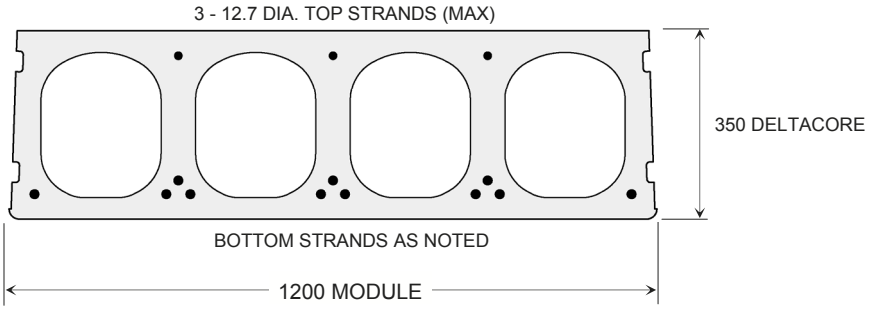


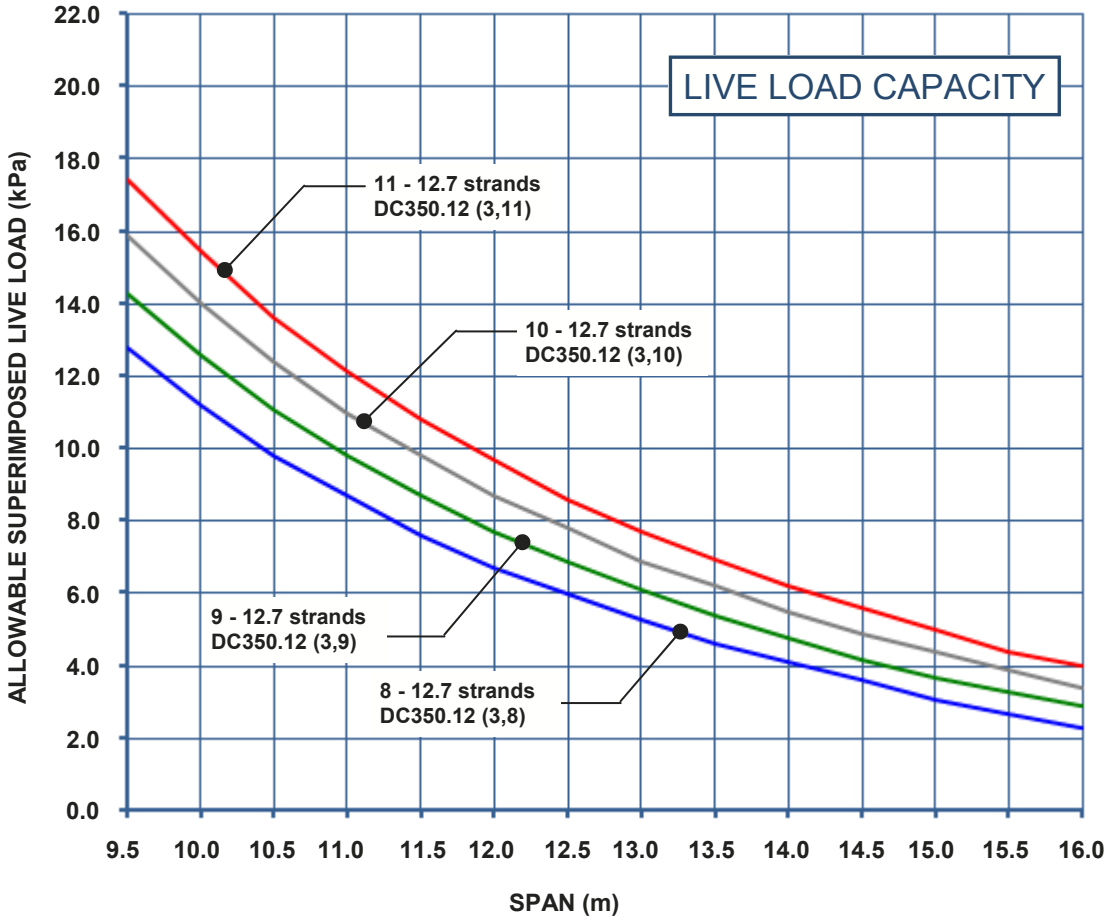
TYPICAL STRAND CONFIGURATIONS

PANEL PROPERTIES		
CROSS SECTIONAL AREA	0.198489 m^2	
WEIGHT (kg) (S.G. 2500 kg/m^3)	Lm	496
	m2	414
EFFECTIVE THICKNESS	168mm	
CONCRETE STRENGTH	60MPa	
STRAND SIZE & NUMBER	BOTTOM	TOP
STANDARD SIZES	12.7mm	12.7mm
MAXIMUM SIZES	15.2mm	12.7mm
MAXIMUM NUMBER	11	3
TOLERANCES		
LENGTH	+10 - 10mm	
WIDTH	+ 3 - 6mm	
THICKNESS	+ 3 - 3mm	
SQUARENESS OF END	+ 6 - 6mm	
LOCATION OF STRANDS	+ 3 - 3mm	
DIFFERENTIAL CAMBER ADJACENT UNITS	2mm/m but not greater than 15mm	
WIND	10mm/3000mm	

Deltacore 350

DC350 Live Load Capacity





NOTES:

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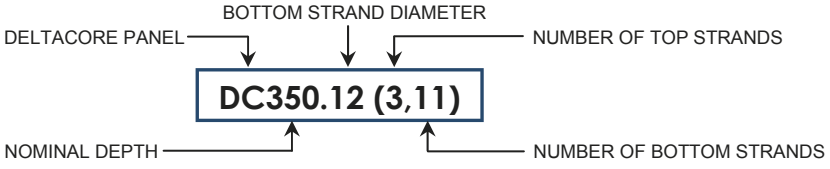

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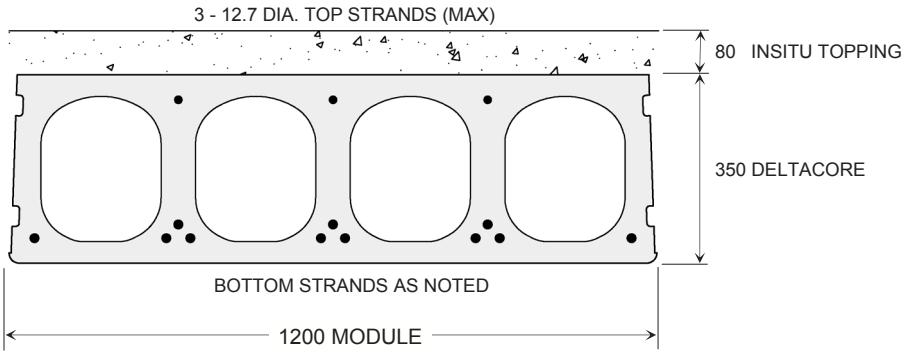
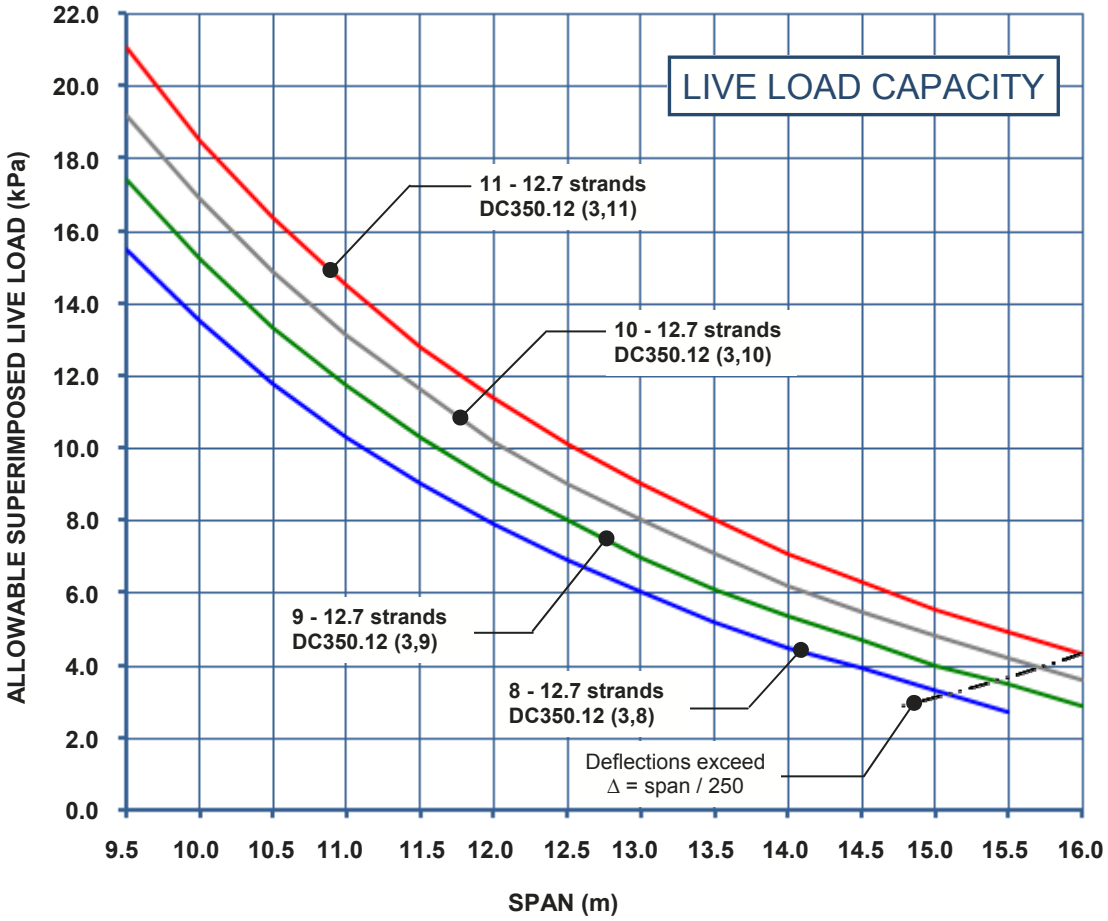
Deltacore 350

DC350 Topped Live Load Capacity





NOTES:

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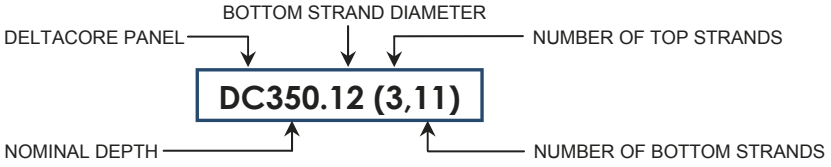

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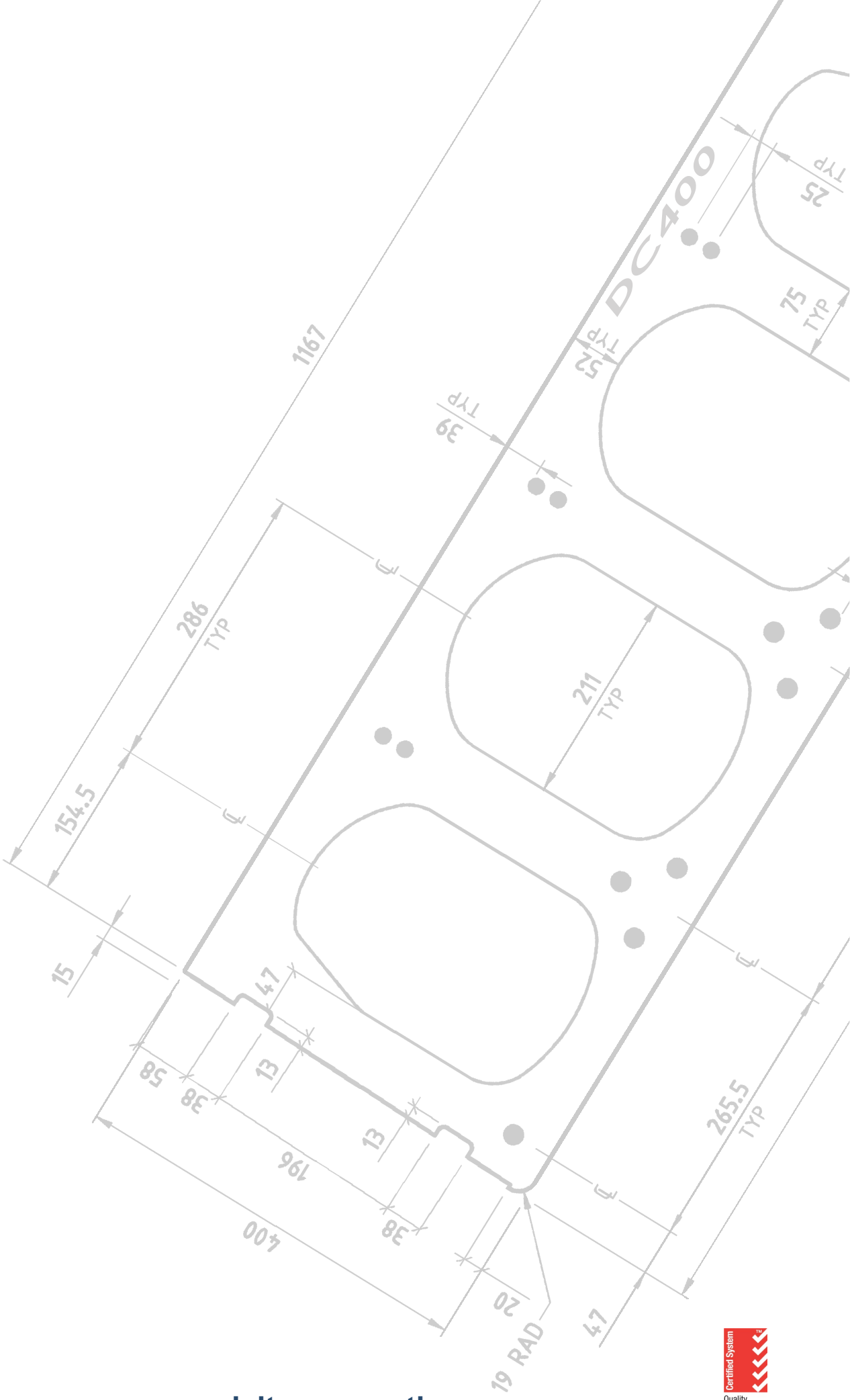
THE STRENGTH

Deltacore



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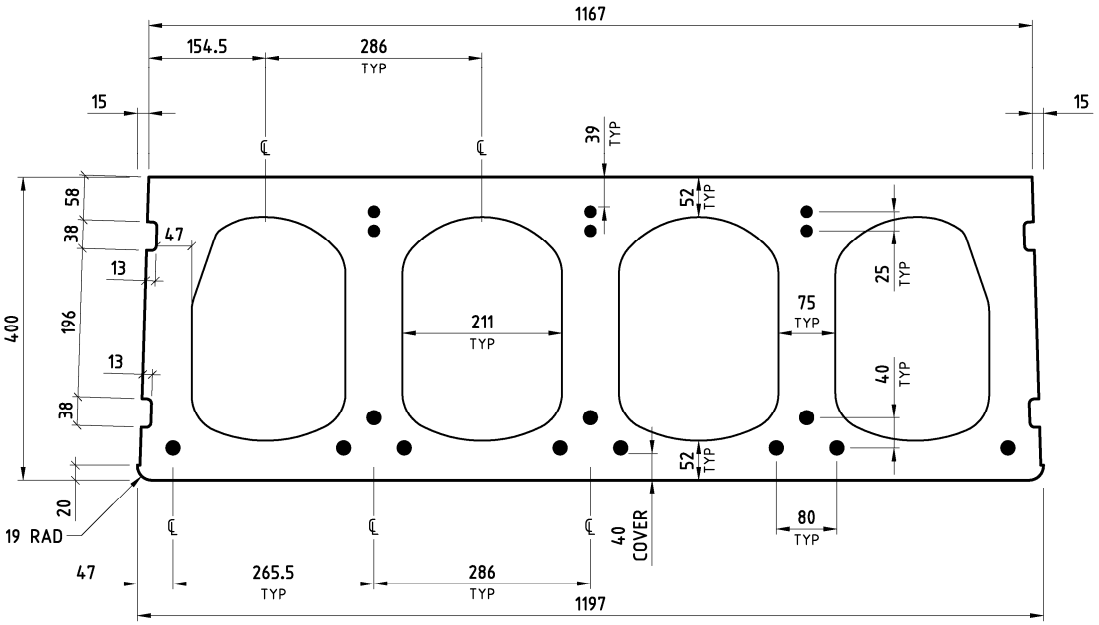
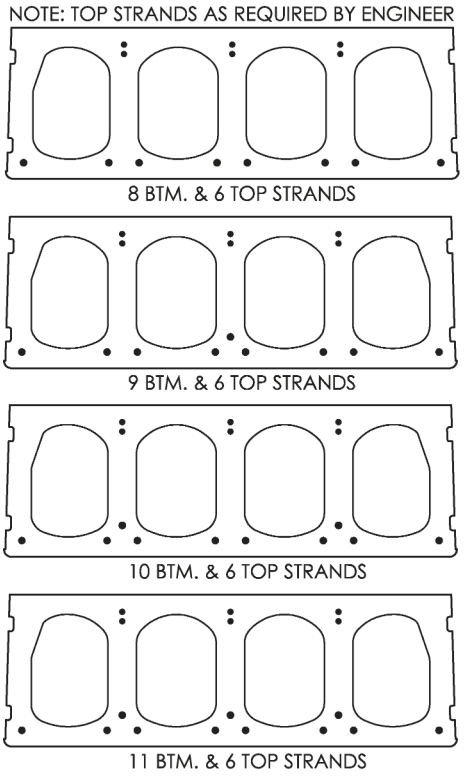
Deltacore 400

DC400 Technical Data



TYPICAL CROSS SECTION DIMENSIONS



TYPICAL STRAND CONFIGURATIONS

PANEL PROPERTIES		
CROSS SECTIONAL AREA	0.251001 m²	
WEIGHT (kg) (S.G. 2500 kg/m³)	Lm	628
	m2	523
EFFECTIVE THICKNESS	212mm	
CONCRETE STRENGTH	60MPa	
STRAND SIZE & NUMBER	BOTTOM	TOP
STANDARD SIZES	12.7mm	9.3mm
MAXIMUM SIZES	15.2mm	9.3mm
MAXIMUM NUMBER	11	6
TOLERANCES		
LENGTH	+10 - 10mm	
WIDTH	+ 3 - 6mm	
THICKNESS	+ 3 - 3mm	
SQUARENESS OF END	+ 6 - 6mm	
LOCATION OF STRANDS	+ 3 - 3mm	
DIFFERENTIAL CAMBER ADJACENT UNITS	2mm/m but not greater than 15mm	
WIND	10mm/3000mm	

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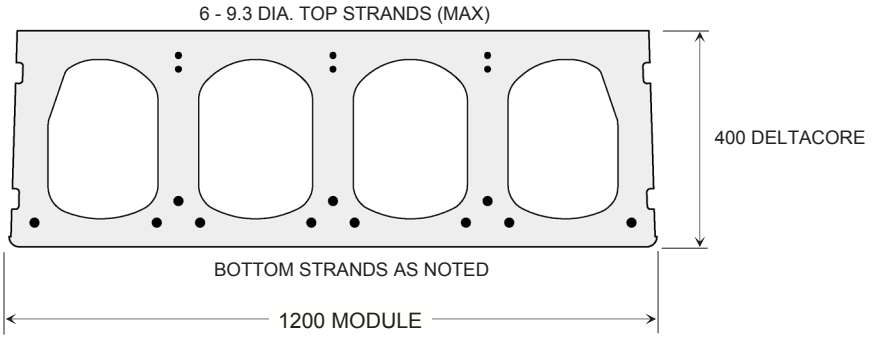
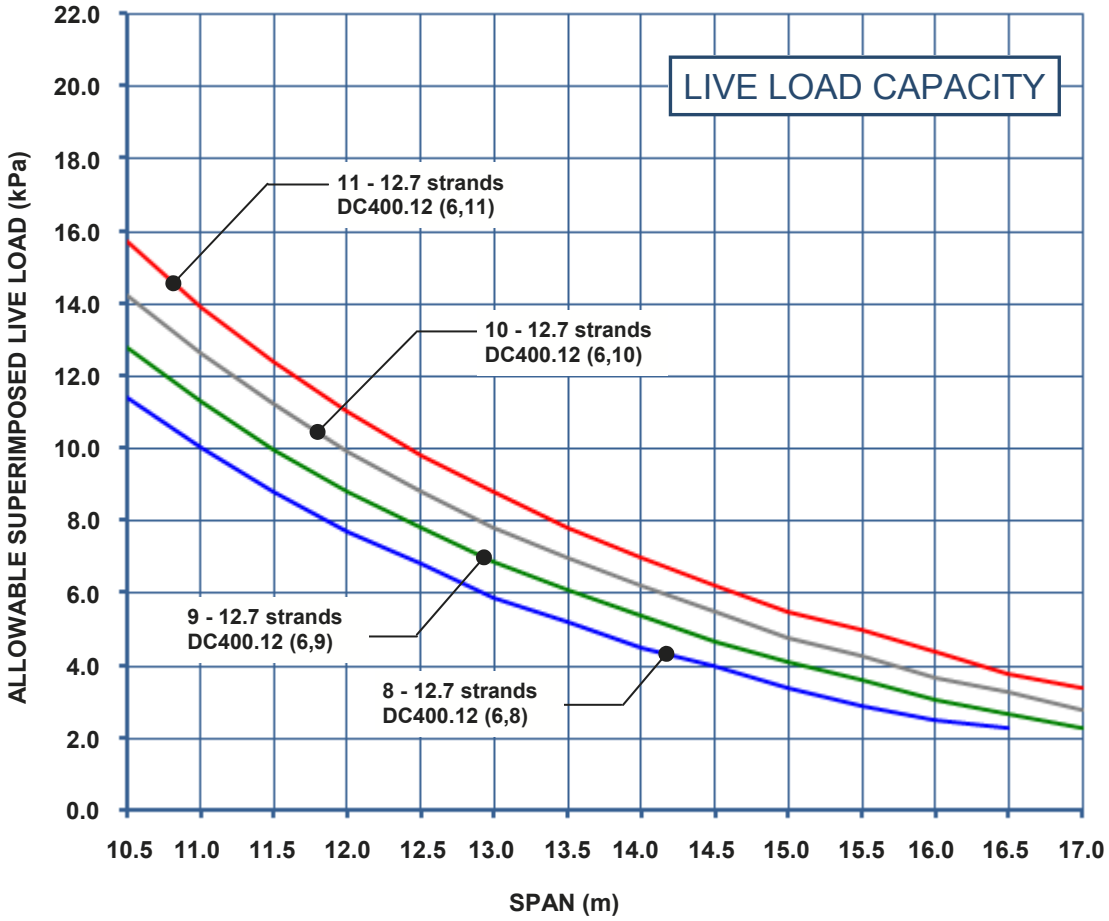
DC400 Live Load Capacity





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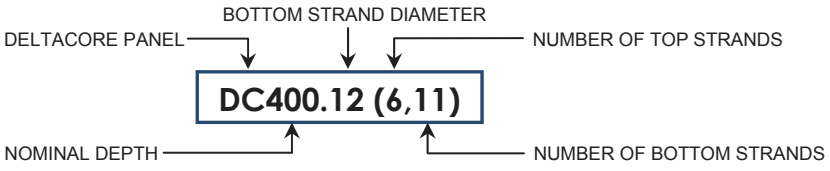
3. Cover to bottom strands 40mm



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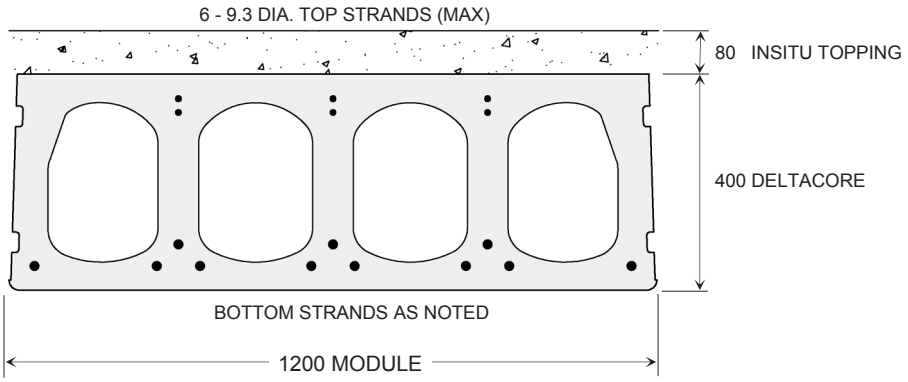
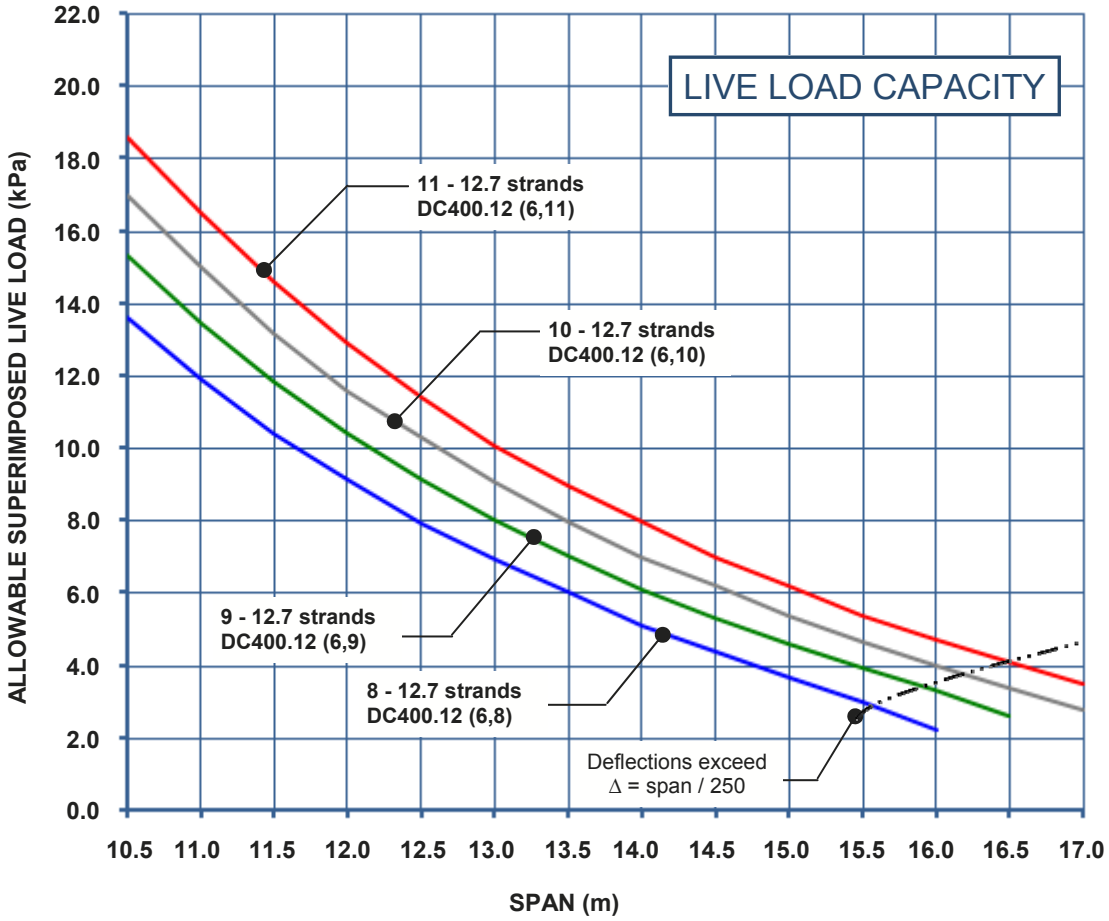
Deltacore 400

DC400 Topped Live Load Capacity





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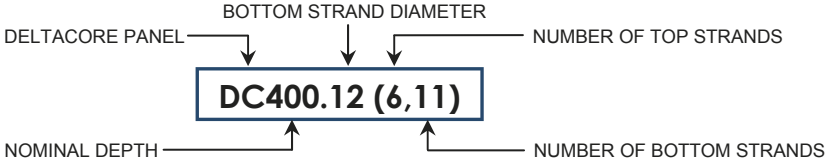

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Guide Specification

This guide specification is intended to be used in the preparation of the specification for a particular project. It should be checked for compatibility with the particular project requirements by deleting any provisions that do not apply and adding special provisions needed.

Scope

This guide specification covers the manufacture and erection of **Deltacore** floor planks.

Design

Planks shall be designed in accordance with AS3600, except where industry practice provides a proven alternative method.

Delta Corporation shall prepare and submit shop drawings for approval of the general arrangement of the planks, architectural and structural intent prior to manufacture. Shop drawings shall show the location of all planks with all major openings detailed. Shop drawings detailing each unit and its strand configuration shall be submitted to the building contractor for approval.

The design of the structure, including checking the adequacy of the **Deltacore** planks for their intended use in the structure shall be the responsibility of the Structural Engineer for the project.

Materials

Cement shall comply with AS3972 and supplementary cementitious materials with AS3582 parts 1 and 2. Aggregates shall comply with AS2758.1. Chemical admixtures shall comply with AS1478.1.

Prestressing steel shall be stress-relieved low-relaxation strand complying with AS1311. Strand shall be clean and free of deleterious substances at the time of concreting.

Concrete shall have minimum characteristic 28-day strength of 60 MPa and shall conform to the requirements of AS3600. Concrete strength at release of prestress shall be a minimum of 35 MPa.

Topping concrete shall have a characteristic 28-day strength of 32 MPa or unless specified otherwise. If topping concrete is used to grout the keyways, the maximum aggregate size shall be 14mm.

Guide Specification - cont.

Manufacture

Deltacore floor planks are cast on a long-line bed by an extruder and mechanically compacted. The top surface shall be intentionally roughened to achieve the specified bond characteristics of the topping or other finishes applied after erection.

The underside finish shall be flat in accordance with good industry practice. Some surface voids and colour variations shall be acceptable in accordance with the sample agreed prior to casting.

Tolerances

Deltacore floor planks shall be supplied in accordance with the following tolerances:

Length	+ / - 10mm
Width	+ 3mm / - 6mm
Thickness	+ / - 3mm
Squareness of end	+ / - 6mm
Wind	10mm per 3000mm
Location of ferrules	+ / - 20mm
Location of Strand	+ / - 3mm
Differential camber adjacent units	2mm/m span but not greater than 15mm

Delivery and Handling

Deltacore floor planks shall be lifted and supported during manufacture, storage, transport and erection operations at the nominated lifting positions only.

Erection

The Building Contractor shall be responsible for providing true and level bearing surfaces for the support of the **Deltacore** planks. Temporary shoring and bracing shall also be provided as necessary to ensure the stability of the structure during erection. The **Deltacore** planks shall be installed by a competent erection contractor. Where Delta Corporation also erects the planks, the Building Contractor shall be responsible for providing suitable and safe access at the site to enable trucks and cranes to operate under their own power.

Bearing strips shall be accurately set where required. Place any additional reinforcement required by the drawings. Keyways shall be filled and compacted with a 3:1 sand-cement grout mix or by the topping concrete using a maximum aggregate size of 14mm with good vibration in the keyway joints. Voids shall be sealed typically 50mm from the end of the plank to prevent egress of topping into the cores. It should not be more than the support length without considering the implications on the support connection characteristics.

Attachments and Penetrations

Attachments and fixings to the **Deltacore** planks shall be in accordance with the approved details only and shall not impair or reduce the strength of the floor planks.

Penetrations and chases to the **Deltacore** planks shall be in accordance with details approved by the Structural Engineer and agreed by Delta.

Insitu Topping

The Building Contractor shall provide a well-compacted insitu structural concrete topping to the floor planks as detailed on the drawings. Reinforcement is to be placed in accordance with structural details. The plank surface shall be clean and free of loose material and lightly wetted immediately prior to placing the topping. Finish and cure the topping so that plastic shrinkage cracks are controlled to acceptable levels. Construction joints in the topping shall be located as shown on the drawings.

Inspection and Acceptance

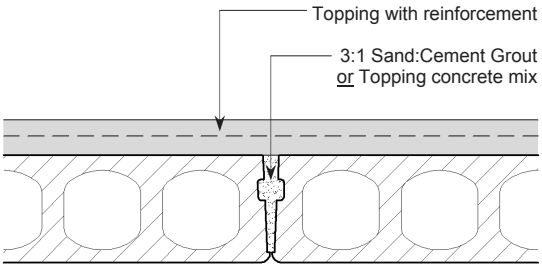
Delta Corporation shall provide access to its production facilities for inspection of work in progress by the Structural Engineer to verify conformity of the product with the project specifications.

General Connections

The connection details at a support must not only transfer load but also contribute to the monolithic behaviour of the entire structure. Tie arrangements in the longitudinal and transverse directions should provide the required diaphragm action, transverse distribution of vertical loads, differential settlements and restrained deformations. In addition, any special forces are to be taken into account, such as those due to frame action and should be specified by the Structural Engineer for the project.

Keyway Connections

To ensure the distribution of superimposed loading across the Deltacore floor system, the keyway joints need to be sufficiently filled with concrete to transfer shear between adjacent planks. Ideally, the joints should be grouted. However, typically the topping concrete with maximum aggregate size of 14mm is used along with good vibration in the keyway joints.



Bearing Support

Deltacore planks are normally designed to be simply supported and the connections at the supports should be detailed accordingly, taking into account the requirement for overall structural integrity. Continuity reinforcement in the topping over the supports must have sufficient cover, allowing for transverse steel and laps.

A connection should not unnecessarily restrain volume change movements that occur in precast concrete. Movement joints should be provided at regular intervals in the structure, usually at every third span longitudinally. If these movements are restrained, significant axial forces can develop in the planks, reducing shear capacity in particular.

The length of compression bearing required to adequately support a plank is a function of the reinforcing detail across a joint and the construction tolerances of the members coming together at the support. Detailing of the bearing length should allow for realistic tolerances and provide adequate clearances for erection and concreting of reinforcement details. The bearing lengths set out below are for simply–supported planks. Tolerances for the dimensions of planks, as supplied, are set out in *Guide Specification.*

Bearing surfaces are often provided with an elastomeric strip set back at the edge. These strips are usually 3mm thick by 50mm wide.

Planks supported on masonry walls require a bearing strip or slip joints to separate the different materials and to prevent cracking or spalling of the brickwork. Rendered walls and cornices should be detailed to permit some movement in the floor planks.

Recommended Bearing Lengths

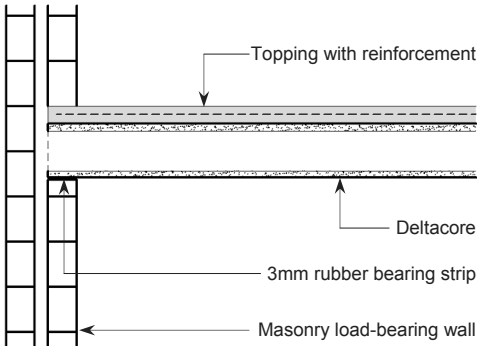
Plank Depth	**Bearing Length** (mm) **on**	
	Concrete	**Steel**
150 - 200	80	80
250	100	100
300, 350	120	120
400	150	125

Torsion of Support Beam

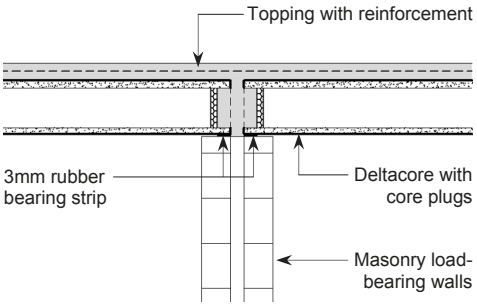
A common oversight during erection is the eccentric loading of planks onto one side only of a support beam leading to dangerous twisting of the beam. Both precast and steel beams are susceptible but the latter are particularly at risk. Precast beams can be detailed with a double-bolted moment connection to the column to resist the torsion. The column may need propping to resist the horizontal component of the torsion as well as other erection loads. For a steel beam, it, and possibly the planks may need to be propped.

The situation can also arise at an end-bay where the floor and beam system may require propping until the designed torsion-resisting connection is active.

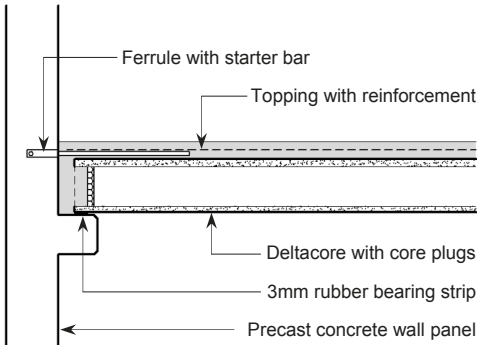
Connections and Supports
Concrete and Masonry Examples



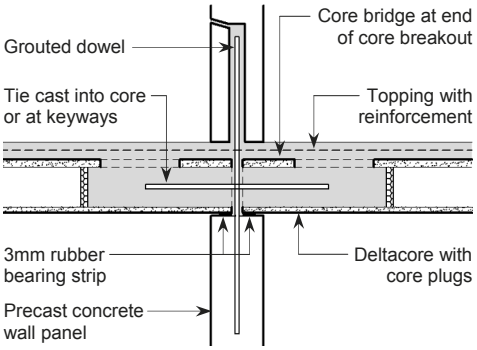
External Masonry Cavity Wall



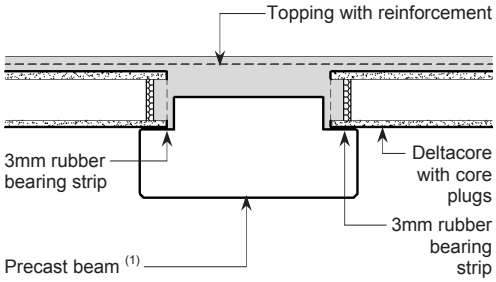
Internal Masonry Cavity Wall



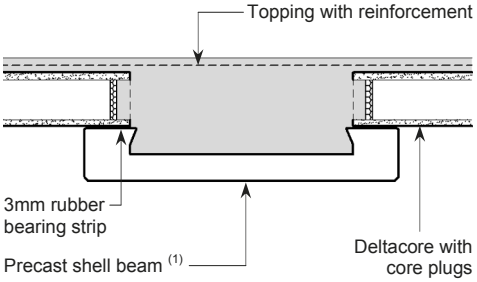
External Concrete Wall



Internal Concrete Wall

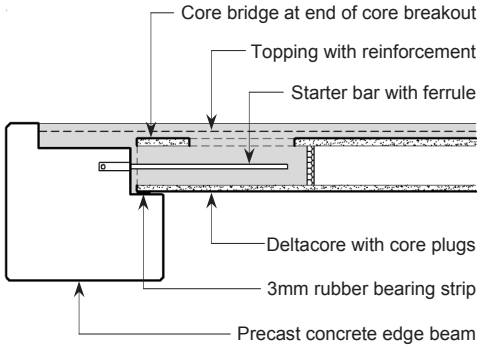


Internal Precast Beam



Internal Precast Shell Beam

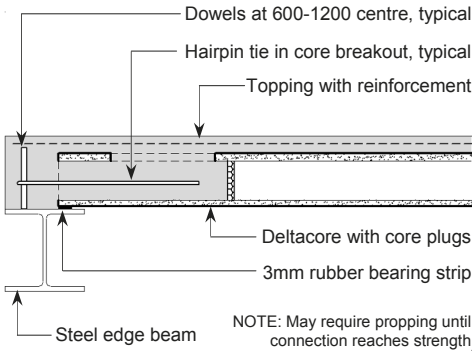
(1) If unrestrained against rotation, beam may require propping if loaded on one side during erection



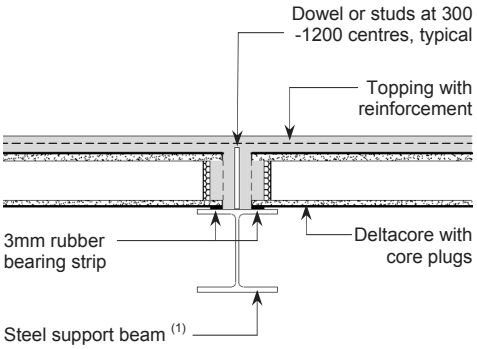
External Precast Edge Beam

Connections and Supports

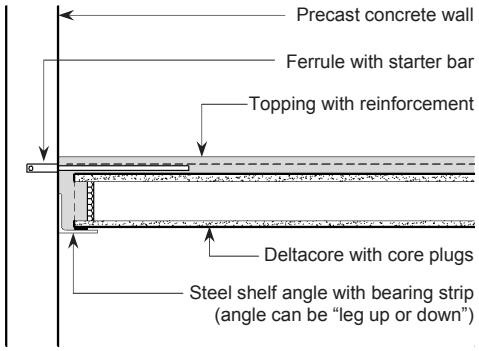
Structural Steel Examples



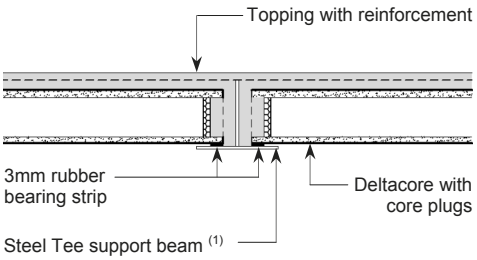
External Steel Edge Beam



Internal Steel Beam



External Steel Shelf Angle



Internal Steel Tee Beam

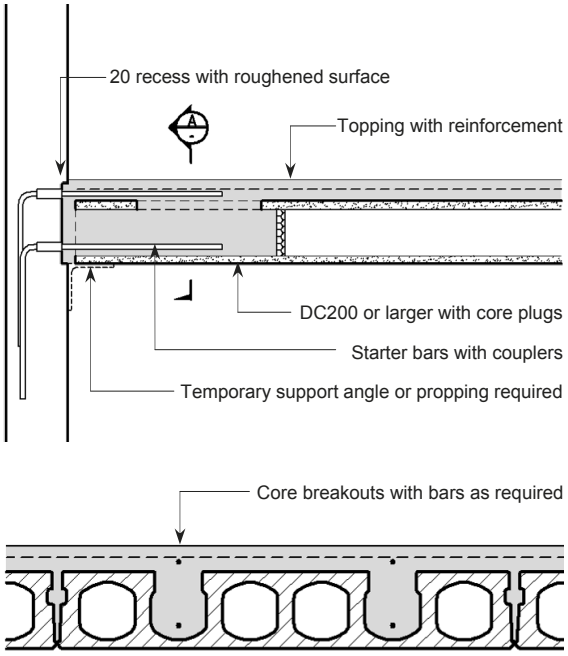
(1) If unrestrained against rotation, beam may require propping if loaded on one side during erection

Steel Notes:

- Steel support beams may be designed for composite action with the plank and topping by providing shear transfer at the interface.
- Bolted splices in the steel beams should be detailed so that they do not interfere with the bearing of the planks.
- During erection steel support beams may require propping until insitu topping reaches strength.

Insitu Connection

A connection type, which does not require a direct bearing or corbel support for the plank, is shown below. An insitu reinforced concrete interface transfers moment and shear between the topped plank and the supporting wall panel. During construction a temporary angle is bolted to the wall to support the plank and topping until the connection gains strength. Projects in which this type of support have been used along with the results of tests are available from Delta Corporation.



Section A

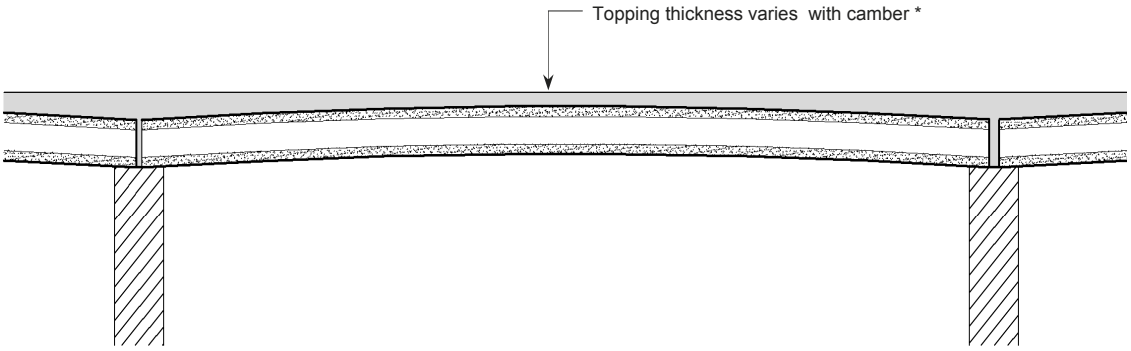
Camber and Fixings

Camber

Deltacore floor planks are generally cambered because of the upward bending induced by the prestressing, as shown below. This camber should be allowed for in detailing the planks and the joints at abutting walls, door openings and the like. A site-cast topping unifies the planks into a monolithic floor, takes out differential levels between units and provides a level working surface.

The minimum thickness of the topping occurs at the highest point on the plank, usually at the centre. The minimum average thickness of a concrete topping is 50mm (AS3600, Cl 8.4.6). However for practical purposes, 60mm topping is used for DC150 and DC250 planks and 80mm for DC300 to DC400 planks with fabric reinforcement for crack control.

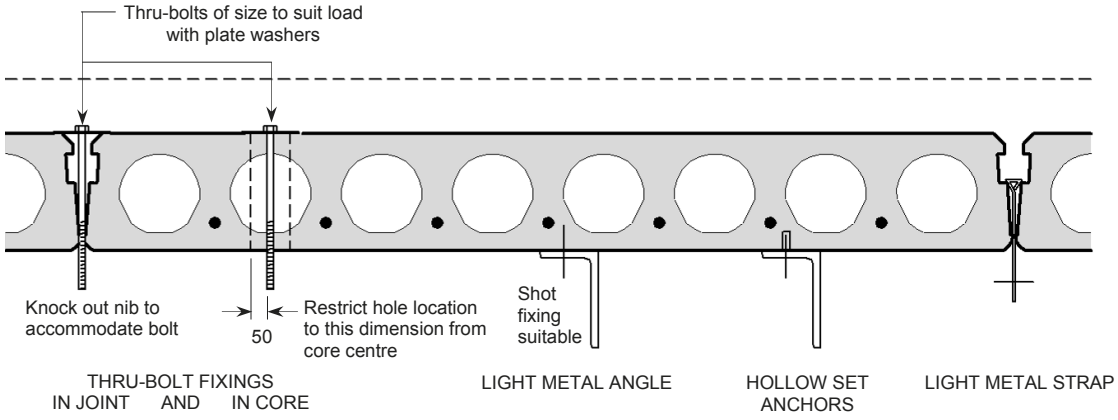
It should be clear on the structural drawings where the topping thickness is to be measured. The drawings should show the location of construction joints.



* camber exaggerated for illustration purposes

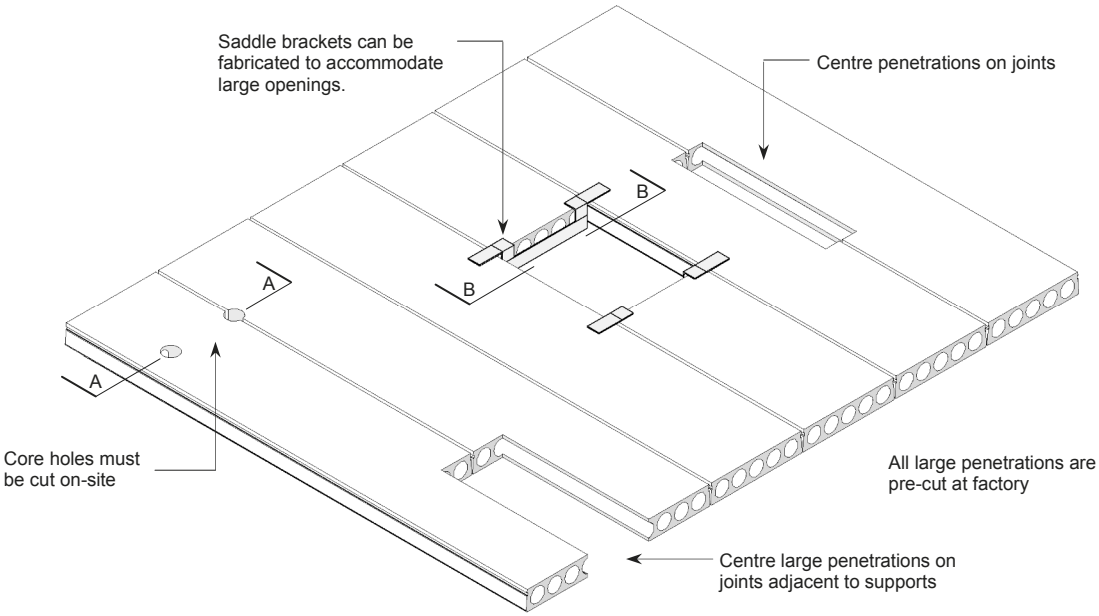
Fixings

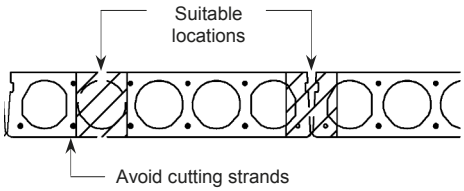
Fixings and support hangers should be installed strictly in accordance with the supplier's directions. Where heavy loads are to be supported, through-bolts to a distribution plate or beam may be required. These are required to be in accordance with the design engineer's specification.



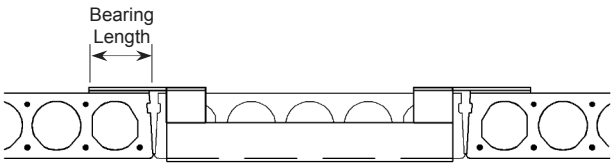
Penetrations

Penetrations and block-outs in planks should not be cut through the strand unless this has been allowed for in the design. Any coring on site should be restricted to defined parts of the plank. Where large penetrations are required full-width headers (saddle brackets) may be used to support the end of the plank and transfer the load to adjacent planks. These planks must be designed for the additional load.





Section A - A



Section B - B

Fire Rating

The fire rating or fire resistance level (FRL) of a floor is specified in the building code as the period in minutes during which the floor must retain its structural adequacy, integrity and insulation when subjected to the standard fire test and is expressed as 180/90/90 for example (i.e. 180 minutes structural adequacy / 90 minutes integrity / 90 minutes insulation).

The Concrete Structures Code, AS3600, specifies that fire resistance be met either by testing or calculation or by proportioning members to comply with certain rules. In practice the deemed-to-comply rules are adopted as a convenient method of compliance. Two criteria must be satisfied.

- Insulation requires a minimum effective thickness of concrete and a minimum thickness of concrete between adjacent cores and between a core and an exposed surface.
- Structural adequacy requires a minimum concrete cover to the strands.

The deemed-to-comply requirements are summarised below.

The effective thickness of a Deltacore plank is taken as the nett cross-sectional area divided by its width. If the effective thickness is not sufficient to achieve the required fire rating, this can be increased by providing a concrete topping or an insulating layer to the soffit.

Grouted joints of untopped planks have been shown by fire tests to provide a fire resistance level at least equal to that of the plank section. However untopped planks should be generally restricted to lower fire resistance levels unless adequate restraint or tie reinforcement at the ends of the planks can be provided to stop spreading.

If the required cover to the strand results in an inefficient design for the specified load capacity, the cover can be increased by applying an appropriate thickness of insulating material to the soffit. Continuity can also be used to increase the structural adequacy for a given cover as per AS3600, Clause 5.5.4.

Section Dimensions for Deemed-to-Comply Fire Resistance Periods

	Fire Resistance Period (minutes)					
Section Dimensions	30	60	90	120	180	240
Effective thickness (mm)	60	80	100	120	150	170
Concrete thickness between cores and between cores and exposed surfaces (mm)	25	25	25	25	30	34
Required cover to strand (mm)						
Simply-supported span	20	25	35	40	55	65
Continuous span	15	20	25	25	35	45

Deltacore floor plank	**Fire Resistance Level (FRL) ***	
	Simply-supported span	Continuous span
DC150	75 / 75 / 75	150 / 150 / 150
DC200	120 / 120 / 120	210 / 210 / 210
DC250	120 / 120 / 120	210 / 210 / 210
DC300	120 / 120 / 120	210 / 210 / 210
DC350	120 / 120 / 120	210 / 210 / 210
DC400	120 / 120 / 120	210 / 210 / 210

* Values based on a typical concrete topping being applied.

Sound Insulation

Deltacore floor planks provide a high level of acoustic insulation to airborne sound transmission and are similar to solid concrete slabs in the transmission of impact noise. The parameter which is used to measure the resistance of a floor or wall to airborne sound transmission is the R_w rating. R_w stands for *Weighted Sound Reduction Index* and is a single number value representing the sound reduction performance over the frequency range 100Hz to 3150Hz. The larger the value of R_w the greater the sound insulation. A negative adjustment factor C_{Tr} is added to the R_w value to compensate for low frequency sounds in the environment, such as traffic noise and music.

Building codes specify minimum values of sound insulation for floors and walls separating different occupancies in residential buildings. A floor separating dwellings must have an $R_w + C_{Tr}$ not less than 50 dB. Deltacore 150 and 200 planks with a 60mm concrete topping when installed in a residential building with an appropriate ceiling system will meet the airborne sound reduction requirement of the building code.

Impact noise is conducted easily through building materials and can travel great distances. The *Normalised Impact Sound Pressure Level* ($L_{n,w}+C_I$) is a single figure rating of the overall impact sound insulation performance of a floor-ceiling assembly. The BCA requires this not to be greater than 62 dB for floors between dwellings.

The sound reduction performance of the Deltacore floor plank system which incorporates the topping has been predicted using the Sound Insulation Program “Insul Ver6”. Comparison of predictions using the “Insul” program and laboratory test data indicates predictions are generally within 3 R_w points for most construction systems.

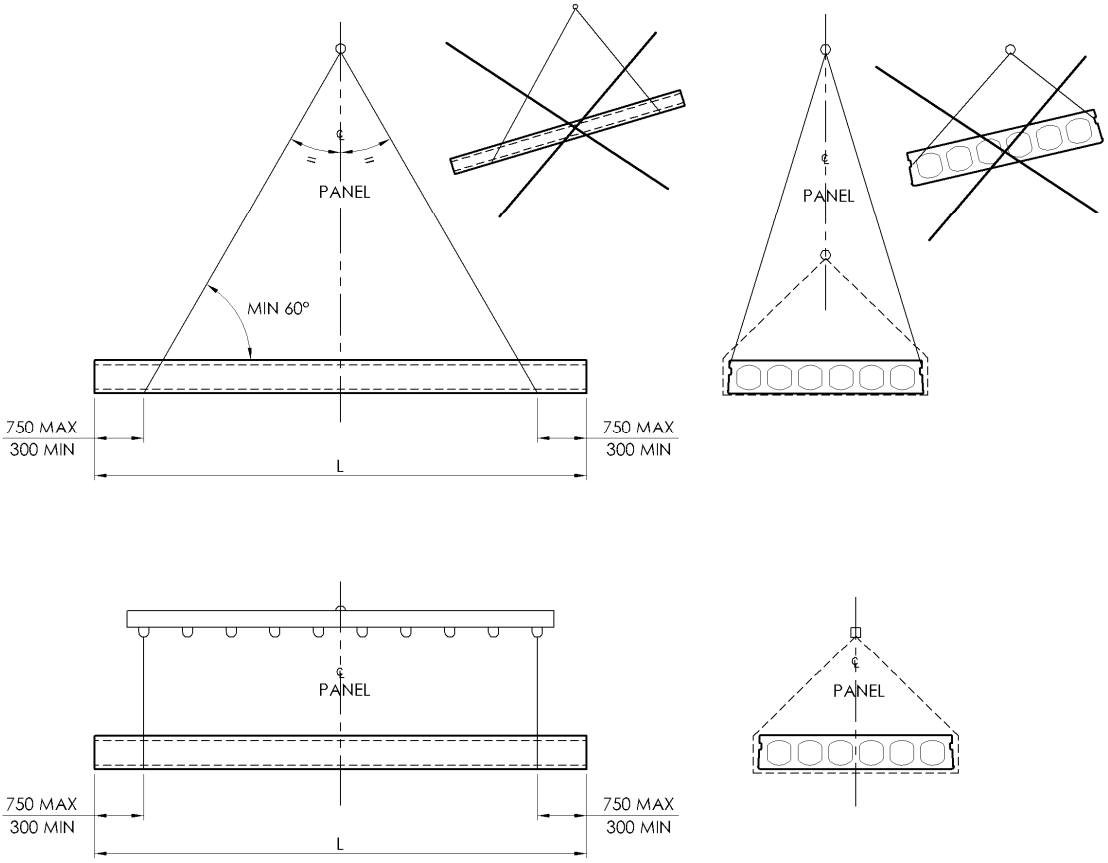
The predicted results are shown in the table below:

*Predicted Sound Reduction**

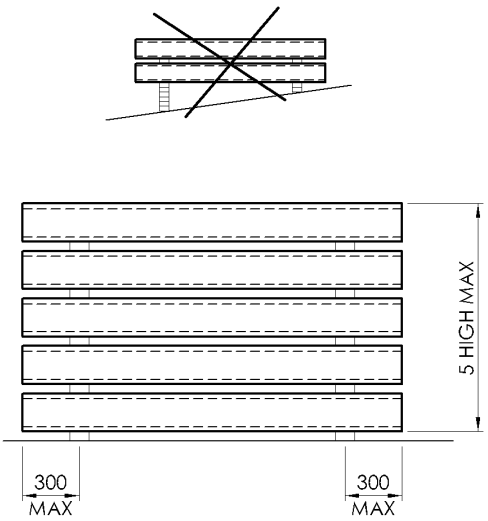
Deltacore Plank	Topping	R_w	C_{Tr}	$R_w + C_{Tr}$
Deltacore DC150 (230 kg/m^2)	60mm	55	-3	52
Deltacore DC200 (260 kg/m^2)	60mm	56	-4	52
Deltacore DC250 (334 kg/m^2)	60mm	58	-4	54
Deltacore DC300 (361 kg/m^2)	80mm	60	-5	55
Deltacore DC350 (414 kg/m^2)	80mm	61	-5	56
Deltacore DC400 (523 kg/m^2)	80mm	62	-5	57

* No allowance is made for acoustic leakage or sound flanking transmission, as these are construction and design issues that must be considered in the design and construction of individual projects

Lifting and Storage Requirements



Lifting Beam If L > 8500



Site Stacking

Note:

1. Balance the load to prevent slippage and to minimise twist on lifting gear and panels.
2. Hoist only one panel at a time.
3. Never use Deltacore panels as a platform for hoisting people or materials.
4. Never hoist by hooking into voids.
5. Never turn panels on edge or upside down.
6. Never put hands inside cores or between panels.
7. Handle panels only with approved appropriate lifting equipment; avoid chains.
8. Refer to Deltacore shop drawings for panel weights.
9. Keep panels horizontal at all times.
10. When stacking panels always do so on firm level ground and ensure supports are positioned one above the other.

Deltacore Green Advantage

Sustainability
Sustainability is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It allows the protection of the environment and prudent use of natural resources. Sustainable development challenges the design and construction industry to create buildings that acknowledge the life cycle of a building.

Recognising that operating a building over time is far more energy intensive than developing it, demand for durability and energy performance is growing. Greenhouse gas emissions in buildings are due to both embodied energy and operating energy.

Deltacore embraces the concepts of sustainability and gives a designer the ability to build knowing they are getting what we call the **Deltacore Green Advantage.**

The **Deltacore Green Advantage** is achieved from every angle…

- ✓ Lean manufacture, superior curing techniques, repetitive use of steel casting beds, specially designed concrete mixes mean a higher quality product with very little waste.
- ✓ Through the use of voids and prestressed strands, the volume of reinforcing steel required for a Deltacore floor system is significantly less than other flooring systems using traditional reinforcement.
- ✓ For an equivalent floor area, Deltacore planks can be transported to site more efficiently than using traditional insitu concrete.
- ✓ Large column-free spans means significant less reinforced concrete and/or steel required for the supporting structure.
- ✓ Formwork and propping can be eliminated saving vast amounts of materials that would typically become waste.
- ✓ Local materials are used; transportation is minimised.

DELTA
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FOR FURTHER INFORMATION OR AN OBLIGATION-FREE QUOTE, CONTACT US TODAY.

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