

abeo®

SL-DECK
TECHNICAL DATA SHEET



ABOUT THE SL-DECK

The SL-Deck is a prestressed concrete slab suitable for multilevel residential-, commercial-, and industrial buildings as well as for multilevel car parks.

The slab consists of a combination of lightweight concrete with a density of 700 kg/m³ and a self compacting concrete (SCC) with a density of 2.400 kg/m³.

The light-aggregate concrete is casted with a special curved geometry leaving both lengthwise and transversal grooves, which form the structure of the self-compacting concrete. Thus the strong self-compacting concrete constitutes a ribbed slab surrounded by an insulating and stabilizing layer of lightweight concrete.

Prestressed reinforcement is placed in the lengthwise grooves of the slab and normal reinforcement is placed in all the transversal grooves, hereby a structure of cross reinforcement is established. The amount and dimension of the reinforcement can be adjusted to fit the needs of a specific project.

A minimum of 200 mm of massive SCC is casted in each end of the slab, securing a high ability to handle shear forces in the areas where the slabs are supported. If necessary, additional reinforcement can be added to the ends of the slabs.



PRODUCTION METHOD

The SL-Deck is produced in Denmark by Perstrup Beton Industri on 85 meter long moulds.

Firstly, the length of each slab is determined and end forms are placed in the end of each slab, additional forms for openings, curves or special narrow slabs are placed on the mould.

A thin layer of mortar is placed before the light-weight concrete is casted, this process ensures that the bottom surface of the slab will be smooth and appear similar throughout the production. The light-weight concrete is then casted with a special light aggregate concrete machine (LACM), developed to create the special geometry needed in the SL-Deck. The light-weight concrete is casted as long plates continuous plates with raised portions of concrete forming the lengthwise and transversal grooves.

The machine is controlled by a computer using an input file generated by the production planning software for each day of production. The input file is used to determine where light-weight concrete should be casted and where it should be left out for openings, slab ends etc.

If a ceiling with acoustic properties is needed in a project, the thin layer of mortar can be left out and the light-weight concrete will be showing. By leaving the porous light-weight concrete exposed it will have a positive sound dampening effect in the room below.

After the light-weight concrete has been casted the slab is reinforced with both prestressed and non-stressed steel during this process any fittings, steel plates for welding or other details are also placed in their correct position.

The hydraulic sides of the mould are then pushed in place and the closed mold is filled with the self compacting concrete. Finally, lifting anchors are placed in the wet concrete.

After 12 hours, when the selfcompacting concrete has achieved sufficient strength, the sides are removed and the tension is removed from the prestressing cables. The cables are cut and each slab is ready to be lifted out of the mold and transported to out of the factory for storage.

QUALITY CONTROL

Perstrup Beton Industri's production is monitored by Dancert and the SL-Deck is certified according to DS/EN 13224 certificate nr. 1073-CPD-B087-03

SUPPORTING AREAS

The standard SL-deck is made with a vertical end, but it can be modified to have skewed ends in the vertical direction allowing for a half V shape making the placement of reinforcement between slaps easier. The minimum depth of supporting walls or beams carrying the SL-Deck must be 55 mm as a minimum. The directions below should be followed when planning to install SL-Decks:

SLAB LENGTH L	SUPPORTING DEPTH
L < 7 m	65 mm
7 m < L < 14 m	80 mm
L > 14 m	90 mm

DEFLECTION

The load-carrying capacity tables for the SL-Deck indicate a calculated deflection. Due to contraction of the prestressed steel wires the deflection can vary depending on the length of the slab, production and curing conditions can also impact the actual deflection of each slab.

Difference in deflections across several slabs can be adjusted by blocking up slab or by applying load to a slab after installation but before the grout is applied and has gained the necessary strength.

DECK GEOMETRY

The SL-Deck is delivered in a standard version as a rectangular slab with a width of 2.4 m. (2396 mm). It is possible to deliver the SL-Deck with curved and skewed sides and ends, and by doing so adjust the geometry of the slab to the shape of the final building.

The SL-Deck can also be delivered in widths smaller than 2.4 meter.

The SL-Deck can be delivered with a height of 220 mm, 270 mm and 320 mm.

OPENINGS

The SL-Deck can be delivered with a large variety of openings as long as attention is paid to the placement of the steel reinforcement and the load carrying capacity of the individual slab and of the final structure.

The openings are made by placing opening molds on the casting lanes before the light-weight concrete is casted.

CONCENTRATED LOADS

Due to the design of the standard SL-Deck comprising zones of primary light-weight concrete and others of primary stronger concrete, the load capacity for single point loads varies across the deck. Zones comprised primarily of light-weight concrete have a limited capacity for single point loads. However, it is possible to place massive zones wherever they are needed if predefined by the customer. In addition, additional normal reinforcement can be placed in these areas in order to further increase the capacity for concentrated loads.

LIFTING

The standard SL-Deck is fitted with 4 lifting anchors placed symmetrically around the center of gravity. The anchors can be replaced with lifting loops or similar if requested.

More information, please refer to the SL-Deck installation manual.

CALCULATIONS

The SL-Deck will be dimensioned and calculated according to the Eurocode 2 (DS/EN 1992-1-1) to each individual.

ENVIRONMENTAL CLASSES

The standard SL-Deck is designed to fulfill the requirements of a passive environment. However, it is possible to produce the SL-Deck to fulfill the requirements of other environmental classes, including especially aggressive environmental classes for parking facilities etc.

CONCRETE QUALITY

The self compacting concrete SCC has the compression strength $f_{ck} = 55$

The light-weight concrete has the compression strength $f_{ck} = 3$ MPa

REINFORCEMENT

Prestressed steel reinforcement is used according to the below table:

STANDARD	STRENGTH	DIAMETER	MAXIMUM TENSION	TYPICAL 0,1 % TENSION
EN10138-3	1860 MPa	12,5 MM	≥ 1860 MPa	≥ 1634 MPa

Non-prestressed steel reinforcement is used according to the below table:

STANDARD	STANDARD DIMENSIONS	CLASS ACCORDING TO EN1992-1-1	TYPICAL PRETENSION FORCE
DS/EN 10080	6, 8, 10, 12, 14, 16, 20 mm	B	550 MPa

TOLERANCES

The SL-Deck is produced with the following tolerances:

LENGTH	L < 7 M 7 < L < 14,4 L > 14,4 LARGER WHEN ENDS ARE NOT 90 DEGREE ANGLE ON SIDES	+ 12 mm + 20 mm + 30 mm MAX 6 mm PER 0,5 M
WIDTH	FULL WIDTH (2396 mm) VARIATIONS (< 2396mm)	+ 5 mm + 20 mm
HEIGHT	T < 320 mm T = 320	+ 8 mm + 12 mm
OPENINGS	SIZE PLACEMENT	+ 10 mm + 15 mm
FITTED PARTS	PLACEMENT	+ 15 mm

SURFACES

The surfaces (top and bottom) are both made with a smooth solid finish.

However, the SL-Deck can be produced with an porous structure providing the slab with a sound dampening effect on the room below.

The SL-Deck is casted on steel moulds were the sides have been fitted with small blocks, creating recesses on the side of the slab. These recesses work as shear locks after they have been filled with grout during the on-site installation.

FIRE RESISTANCE

The fire resistance of the SL-Deck is calculated based on the case of a standard fire. Depending on the span, load and reinforcement, the SL-Deck can withstand fires according to REI240.

SOUND

The acoustic properties of the SL-Deck has been tested at DTU Elektro (The Technical University of Denmark). Tests showed that the SL-Deck has airborne insulation values of $R'_w = 57$ dB and stepnoise levels of $L'_{n,w} = 79$ dB without additional flooring installed.

