

Pre-Design Table for Concrete Slabs on Ground

BarChip 48 - Load Location: Edge

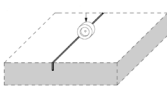

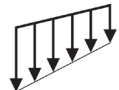

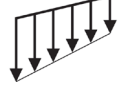
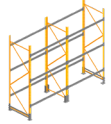

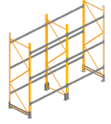



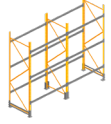










Subgrade Condition		k [N/mm ³]	0.03			0.065			0.10				
		CBR [%]	5			20			35				
		E _{v2} [MPa]	40			80			120				
Load Combinations - Edge Position		BarChip 48 Fibre Dosage [kg/m ³]	2.5	3.5	5.0	2.5	3.5	5.0	2.5	3.5	5.0		
			Minimum Slab Thickness [mm]										
Light Distributed Loads UDL: 30 kN/m ²		LL: 16 kN/m		100	100	100	100	100	100	100	100	100	100
Medium Distributed Loads UDL: 50 kN/m ²		LL: 30 kN/m		120	120	120	100	100	100	100	100	100	100
Very Light Loads Single Rack n x 5 kN			Pickup Truck 14 kN Axle Load	100	100	100	100	100	100	100	100	100	100
Light Loads Single Rack n x 20 kN			Forklift FL 1 26 kN	100	100	100	100	100	100	100	100	100	100
Medium Loads Single Rack n x 40 kN			Forklift FL 2 40 kN	140	135	130	125	125	115	120	115	110	110
Heavy Loads Single Rack n x 60 kN			Forklift FL 3 63 kN	180	175	165	170	160	155	160	155	150	150
Medium Loads Double Rack n x 40 kN			Forklift FL 2 40 kN	155	150	145	145	140	140	140	140	140	140
Heavy Loads Double Rack n x 60 kN			Forklift FL 3 63 kN	180	175	165	170	165	165	170	170	170	170
Very Heavy Loads Double Rack n x 80 kN			Forklift FL 4 90 kN	220	210	200	205	200	190	195	190	190	190
Heavy Vehicle Loads Truck 75 kN Axle Load (single wheels)			Forklift FL 3 63 kN	135	130	125	130	125	120	125	120	120	120
Very Heavy Vehicle Loads Truck 120 kN Axle Load (twin wheels)			Forklift FL 5 140 kN	220	215	200	205	195	185	195	185	185	185

Table 1: Estimated Values for Subgrade Coefficient *k*

Subgrade	<i>k</i> [N/mm ³]
Well compacted sand	0.05 - 0.10
Very well compacted sand	0.10 - 0.15
Loam or clay (moist)	0.03 - 0.06
Loam or clay (dry)	0.08 - 0.10
Clay with sand	0.08 - 0.10
Crushed stone with sand	0.10 - 0.15
Coarse crushed stone	0.20 - 0.25
Well compacted crushed stone	0.20 - 0.30

Legend

UDL: Uniformly distributed load

LL: Line load

Rack: Single rack foot load

Single rack: Aisle on both sides of rack

Double rack: Back-to-back racking

Forklift: Main axle loads, single wheels

Truck: Main axle loads, single or twin wheels

FL X: Forklift type X according to Eurocode 1 with given max. axle load (EC1, Table 6.6)

Table 2: Definitions and Assumptions for the Design Calculations

Concrete class:	C30/37	Contact area and dimensions:	
Exposure classes:	XC2, XC3, XD3, XM2	Rack dimensions:	2700 x 1100 [mm]
Joint spacing:	max. 6 x 6 [m]	Rack foot plates:	120 x 120 [mm]
Partial load safety factors:		Distance of load superimpositions:	
- for racking:	1.20	Rack feet back-to-back:	300 mm
- for vehicles:	1.60	Rack foot - forklift wheel:	300 mm
- for UDL/LL	1.50	Truck wheel - forklift wheel:	300 mm

Disclaimer and Instructions for Use

This design table is intended to estimate the required thickness of concrete industrial floors and pavements reinforced with BarChip 48 macro synthetic fibre by BarChip Inc. The fibre dose rate and the thickness of the fibre reinforced concrete slab on grade is herein calculated for the given ground condition and typical load combinations in edge position (i.e. joint with 25% vertical load transmission capacity).

The structural design calculations in this table have been carried out in accordance with the UK Concrete Society's Technical Report 34: Concrete Industrial Ground Floors – A guide to design and construction (TR34 4th edition). All stated load values have been increased by the referring partial load safety factor as per Table 2, where further assumptions and definitions for the calculations can be found.

The concrete slab is considered inside a building, i.e. closed and covered, during construction and use. If the intended use of the slab is in external conditions (open to the environment, in construction and/or during

its use) then additional concrete thickness or fibre dose rate will be required to account for environmental impact and intrinsic effects.

TR 34 recommends a minimum slab thickness of 150 mm. Where thicknesses in this table fall below the minimum recommended thickness, these are provided solely for information and it is at the discretion of the user to opt for a thickness that is lower than the recommended minimum by TR34. In general, the slab thickness shall never fall below 100 mm for robustness and reduced curling effects.

A detailed structural design must always be carried out prior to execution of the slab. We appreciate your request for support and can provide you with a full structural design optimised for economy.

BarChip accepts no responsibility for slabs that are constructed based on these tables without prior consultation with BarChip to develop a detailed project specific structural design.

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