

Pre-Design Table for Concrete Slabs on Ground

BarChip 48 - Load Location: Internal

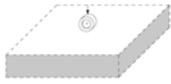

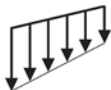

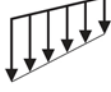
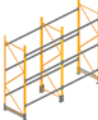

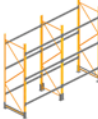

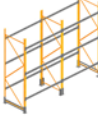

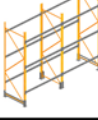



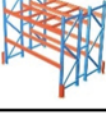

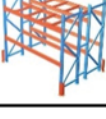





Subgrade Condition		k [N/mm ³]	0.03			0.065			0.10			
		CBR [%]	5			20			35			
		E _{v2} [MPa]	40			80			120			
Load Combinations - Internal Position		BarChip 48 Fibre Dosage [kg/m ³]	2.5	3.5	5.0	2.5	3.5	5.0	2.5	3.5	5.0	
			Minimum Slab Thickness [mm]									
Light Distributed Loads		LL: 16 kN/m		100	100	100	100	100	100	100	100	100
UDL: 30 kN/m ²												
Medium Distributed Loads		LL: 30 kN/m		120	120	120	100	100	100	100	100	100
UDL: 50 kN/m ²												
Very Light Loads Single Rack n x 5 kN			Pickup Truck 14 kN Axle Load	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
Medium Loads Single Rack n x 40 kN			Forklift FL 2 40 kN	125	115	105	110	105	100	105	100	100
Heavy Loads Single Rack n x 60 kN			Forklift FL 3 63 kN	165	155	140	150	140	130	140	130	125
Medium Loads Double Rack n x 40 kN			Forklift FL 2 40 kN	135	125	115	120	115	105	115	105	100
Heavy Loads Double Rack n x 60 kN			Forklift FL 3 63 kN	165	155	150	155	150	140	150	145	130
Very Heavy Loads Double Rack n x 80 kN			Forklift FL 4 90 kN	200	185	170	180	170	170	170	170	170
Heavy Vehicle Loads Truck			Forklift FL 3 63 kN	115	110	105	110	105	100	110	105	100
75 kN Axle Load (single wheels)												
Very Heavy Vehicle Loads Truck			Forklift FL 5 140 kN	175	165	160	165	160	160	160	160	160
120 kN Axle Load (twin wheels)												

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. 10 x 10 [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 internal position (i.e. centre of slab).

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.

The results presented in this table that fall outside of TR34 4th Ed. recommended thickness or joint spacing are based on the laboratory tested performance of BarChip fibre and do not consider project-specific requirements. It is the responsibility of the user to consult with qualified professionals to determine the suitability of the data presented herein for individual projects. 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. Upon request, BarChip can assist with 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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