

Pre-Design Table for Concrete Slabs on Ground
BarChip MQ58 - Load Location: Edge

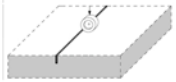

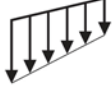

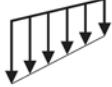




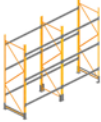



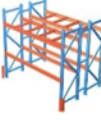

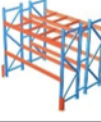

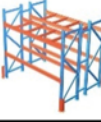





Subgrade Condition		k [N/mm ³]	0.03			0.065			0.10		
		CBR [%]	5			20			35		
		E _{v2} [MPa]	40			80			120		
Load Combinations - Edge Position		BarChip MQ58 Fibre Dosage [kg/m ³]	2.5	3.5	5.0	2.5	3.5	5.0	2.5	3.5	5.0
			Minimum Slab Thickness [mm]								
Light Distributed Loads UDL: 30 kN/m ²		LL: 16 kN/m 	100	100	100	100	100	100	100	100	100
Medium Distributed Loads UDL: 50 kN/m ²		LL: 30 kN/m 	120	120	120	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
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	140	135	130	130	125	120	125	120	115
Heavy Loads Single Rack n x 60 kN		 Forklift FL 3 63 kN	185	180	170	170	165	165	165	160	160
Medium Loads Double Rack n x 40 kN		 Forklift FL 2 40 kN	155	155	150	150	145	140	145	140	135
Heavy Loads Double Rack n x 60 kN		 Forklift FL 3 63 kN	185	180	170	170	165	165	165	160	160
Very Heavy Loads Double Rack n x 80 kN		 Forklift FL 4 90 kN	220	215	210	210	205	195	200	195	190
Heavy Vehicle Loads Truck 75 kN Axle Load (single wheels)		 Forklift FL 3 63 kN	135	135	130	130	125	125	125	125	120
Very Heavy Vehicle Loads Truck 120 kN Axle Load (twin wheels)		 Forklift FL 5 140 kN	225	220	210	210	200	195	195	190	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. 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 MQ58 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.

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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