BALCROM
ENGINEERED CONCRETE

Rib & Infill Specifications

The Rib and Infill flooring system incorporates prestressed concrete ribs, permanent formwork (usually timber) and an in situ concrete topping to give an extremely lightweight and versatile suspended floor. Temporary propping is normally required.

An extremely lightweight finished floor. (Consideration at the design stage can reduce the cost of the supporting structure by reducing load on beams, columns and foundations.) The economies extend beyond the supply price of the Balcrom components.

Timber infills are a light, easily handled and quickly placed component. They can easily be cut to suit awkward shapes and angles, to provide adjustment to the module or to accommodate penetrations. They provide an excellent surface for fixing services such as electrical wiring, plumbing, ceilings hangers etc.

concretenz
PRECAST
CERTIFIED PLANT

Telarc. Registered — Environment ISO 14001
Telarc. Registered — Quality ISO 9001
Telarc. Registered — Health & Safety ISO 45001

Application

Suitable for structural suspended floors in most buildings. Especially advantageous for structures on poor soils or high seismic zones by minimizing the building's weight as well as buildings with difficult access.

Prestressed ribs

The ribs are cast to the required length in steel moulds. They are 170mm wide at the base with tapered sides and 100mm to 300mm high at the rebate.

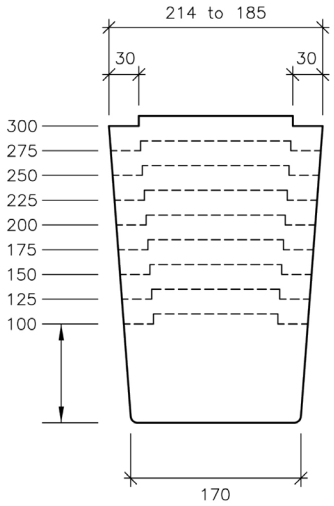
The ribs have a roughened top surface and this together with steel ties projecting from the rib, bonds the ribs and topping together to act as a composite unit.

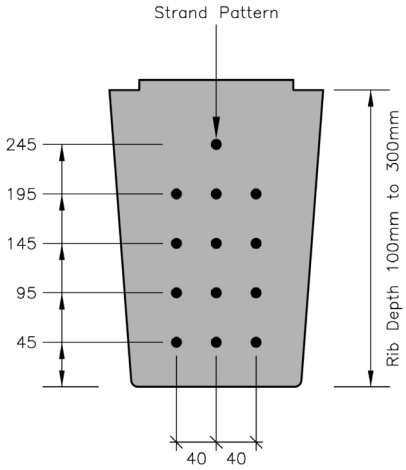
Infill units

The infills are generally 25mm thick rough sawn pine, merchantable grade, treated to PTC specification H3, cut to modular length. Other materials and types and grades of timber can be used including TG&V, stained and coated dressed timber. The timber can be prefabricated into lengths to give quick placement of large units. This will also increase the depth and load capacity of the floor.

Rib dimensions

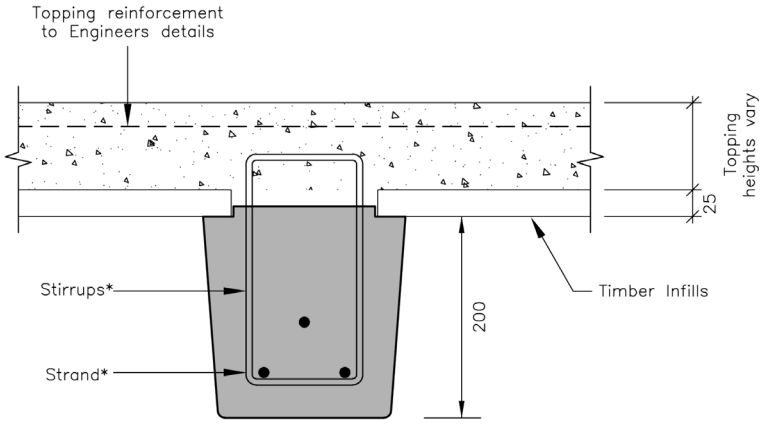
Note: Dimensions may vary slightly.





Section

Refer to specific design for seto



Example: "200 Rib @ 900 crs, 300mm O/A" indicates 200mm deep Rib + 25mm thick timber infills + 75mm Topping concrete = 300mm overall depth.

Rib & Infill load/span table

Unfactored maximum superimposed live load (Qb) in kilopascals (kPa), (assuming no superimposed dead load ie. SDL = 0kPa).
75 mm of 25MPa topping concrete on rough sawn 25 mm thick pinus radiata timber infills on ribs spaced at 900 mm centres.

Rib depth (mm)	Self wt (kPa)	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	10	11	12	13	14
100	2.6	10.3	7.0	6.0	4.0	3.5	2.0									
125	2.8		10.8	7.6	6.7	5.5	4.3	3.7								
150	2.9				8.3	6.4	5.5	4.8	4.0	3.5						
175	3.0						8.4	6.4	5.5	4.8	4.0	2.5				
200	3.2							8.8	7.3	6.3	5.5	4.0	2.5			
225	3.3								9.0	7.8	6.5	4.5	3.0			
250	3.5									8.9	8.0	6.0	4.0	3.0		
275	3.6										9.5	7.0	5.0	3.5	2.5	
300	3.7											8.5	6.5	4.5	3.5	2.0

Unfactored maximum superimposed live load (Qb) in kilopascals (kPa), (assuming no superimposed dead load ie. SDL = 0kPa).
100 mm of 25MPa topping concrete on rough sawn 25 mm thick pinus radiata timber infills on ribs spaced at 900 mm centres.

Rib depth (mm)	Self wt (kPa)	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	10	11	12	13	14
100	3.2	13.4	9.1	7.8	5.2	4.5	3.3									
125	3.4		14.1	7.2	7.8	7.2	5.6	4.8								
150	3.5				10.8	8.5	7.2	6.2	5.2	4.6						
175	3.7						11.0	8.3	7.2	6.2	5.2	3.2				
200	3.8							11.4	9.5	9.5	7.2	5.2	3.2			
225	3.9								11.7	10.1	8.5	5.9	3.9			
250	4.1									11.6	10.4	7.8	5.2	3.9		
275	4.2										12.4	9.1	6.5	4.6	3.3	
300	4.3											11.1	8.5	5.9	4.6	2.6

Notes regarding Load/Span tables

1. Consideration needs to be given to long term creep effects due to higher superimposed dead loads. Contract Balcrom for guidance.
2. The Load Span tables assume loads are uniformly distributed. Considerations is required for shear actions induced from point loads. Again contact Balcrom for advice.
3. Theoretical cambers have been limited to span/400. Consider higher cambers for situations close to the tabulated load limits.
4. Refer to our website **www.balcrom.co.nz** for more information.
5. Rib sections do vary slightly in width and depth. Refer “Typical Rib & Infill Section” for this information.
6. The actual prestress used and the capacity of the floor varies according to the design load specified.

Rib & Infill important information

End seating – Balcrom Rib flooring requires a minimum, and the greater of 75 mm or L/180 seating onto unarmoured concrete beam or wall. A construction tolerance of up to 150 mm needs to be compensated for as per cl.18.74 NZS3101:Part 1:2006. Balcrom and the code requires the use of low-friction bearing strips.

Temporary propping – Balcrom Rib flooring does usually require propping. As a guide spans 3–6 m require 1 row, 6–9 m 2 rows and greater then 9 m 3 rows of props. **Refer to safe operating procedure for propping of timber infills.**

Camber - Balcrom Ribs will arrive on site with a positive camber or “hog”. This is unavoidable due to prestressing. Hogging will vary and be influenced by the amount of prestress required to resist the induced loads, length and age of the units exposed to the elements.

Handling and storage – Balcrom Ribs are designed to be lifted using hooks and chains to strand lifting eyes located at ends of length divided by 5 from each end. Ribs need to be dunnaged as close as possible to the lifting location and with blocks in line with the block below, on solid and even ground. Ensure lifting equipment is regularly checked.

Penetrations – Balcrom Rib and infill flooring does allow flexibility for accommodating penetrations up to 700 mm wide through timber section and avoiding the ribs. If a strand is cut through rib on site, place a prop either side and contact Balcrom for a design review.

Rib & Infill section properties

Section properties are based on 900 mm rib spacing with 25 mm timber plus a 75 mm concrete topping.
Composite section modular ratio = 0.67.

			BORE UNIT				COMPOSITE UNIT				
Rib depth (mm)	**Unit wt** (kg/m)	**Overall depth** (mm)	A $x10^3$ mm^2	Y_b mm	I $x10^9$ mm^4	Z_b $x10^6$ mm^3	A^I $x10^3$ mm^2	Y_b^I mm	I^I $x10^9$ mm^4	Z_b^I $x10^6$ mm^3	Z_t^I $x10^6$ mm^3
100	46	200	18	52	0.013	0.250	65	134	0.193	1.44	2.92
125	57	225	22	65	0.026	0.400	69	151	0.277	1.83	3.74
150	69	250	27	77	0.046	0.597	74	167	0.383	2.29	4.61
175	81	275	32	90	0.074	0.822	79	184	0.508	2.76	5.58
200	93	300	36	102	0.111	1.088	83	200	0.658	3.29	6.58
225	105	325	41	115	0.159	1.383	88	214	0.835	3.90	7.52
250	118	350	46	127	0.225	1.772	93	230	1.037	4.51	8.64
275	131	375	51	140	0.295	2.107	98	240	1.270	5.29	9.41
300	144	400	57	152	0.388	2.553	103	256	1.553	6.07	10.78

Typical & Infill acoustic rating

	STC	R_w	D_{nTw}	STC	R_w	D_{nTw}
Rib depth (mm)	75 mm topping concrete			plus suspended ceiling		
100	52	53	55	55	54	56
300	52	54	56	60	60	62

The acoustic table provides STC (Sound Transmission Class) ratings, measured in decibels. Predicted values calculated by Hegley Acoustic Consultants using a complex cross section. Benefit is gained from having a suspended ceiling of 10 mm Gibraltor board suspended below the rib soffit. And additional 8dB benefit if absorption material is used between ribs.

Rib & Infill durability

Balcrom Rib & Infill complies with at best exposure classification B2 as per table 3.6 in NZS3101:part 1:2006 for 50 year life.

Rib & Infill thermal rating

Concrete normal density	**Timber** softwood
0.045	0.77
300	52

R rating (m2°c/w) per 100 mm thickness.
These are estimated thermal resistance ratings provided as a guide only.

Rib & Infill fire resistance rating

New Zealand Standards require a minimum of 95 mm of concrete for 1.5 hours fire rating, 110 for 2 hours and 140 mm for 3 hours. Variations are permitted in the case specific proprietary systems where a complete floor is constructed and then fully loaded and subjected to a full scale controlled fire test carried out by an approved authority to an acceptable standard. Balcrom Rib & Infill systems have been extensively tested and within New Zealand by BRANZ and overseas by the Commonwealth Building Station (now CSIRO). On the basis of these tests, Balcrom Rib & Infill floors qualified for a fire rating of 1.5 hours with 75 mm topping concrete, 2 hours with 90 mm topping and 3 hours with 100 mm of topping concrete. In 2010 CSIRO verified that our testing still complies with the latest fire testing standards.