

ENGINEERED COMPOSITE FLOOR SYSTEM

SUSPENDED CONCRETE FLOOR SYSTEM

FASTER · LIGHTER · EASIER

**UN-PROPPED SPANS
TO 8.5 M****JOISTS PLACED BY
HAND****SERVICES THROUGH
THE JOIST**

PRODUCT MANUAL

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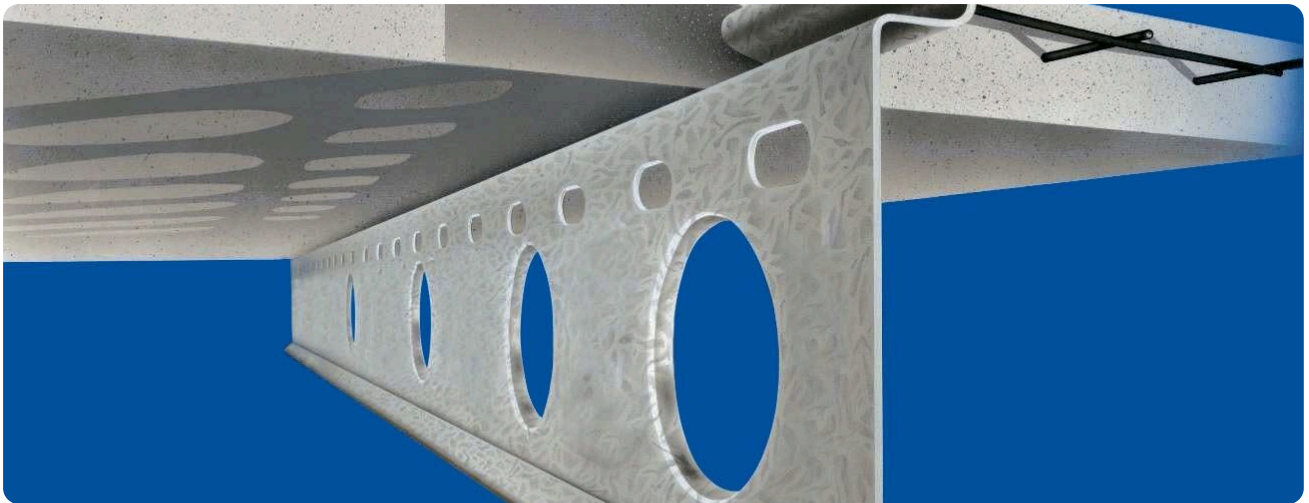
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01 — INTRODUCTION

THE SPEEDFLOOR SYSTEM



The Speedfloor suspended concrete floor system uses a cold-formed steel joist as an integral part of a concrete and steel composite floor. The joist is manufactured from pre-galvanised high-strength steel in a one-pass rollformer, giving a high degree of accuracy at a fast production rate. The ends are simply bolted to the joists, which are then ready for transport to site. On site, the individually marked lightweight joists are placed on the support medium, where a shuttering system locks each joist into its exact position. The reinforcement is placed and the floor is ready to pour.

LIGHTER, FASTER, EASIER



8.5 M SPANS

Un-propped spans to 8.5 m increase beam spacing, reducing structural support, time and materials.



LESS MATERIAL

Speedfloor uses less concrete and less steel for any given span.



LESS CRANAGE

Lightweight joists are positioned by hand, and pre-punched holes let services pass through the floor cavity.

02 — APPLICATION

APPLICATION

Speedfloor combines a concrete slab with a rollformed galvanised steel joist for permanent structural support, using the properties of the concrete and the steel to their best advantage. The joist depth and concrete thickness vary with the span, imposed loads and other functional considerations.

The system is a proven performer in all types of construction:

STEEL STRUCTURES

MASONRY BUILDINGS

IN-SITU & PRECAST CONCRETE

ICF

BRICK AND BLOCKWORK

COMPONENTS — THE JOIST

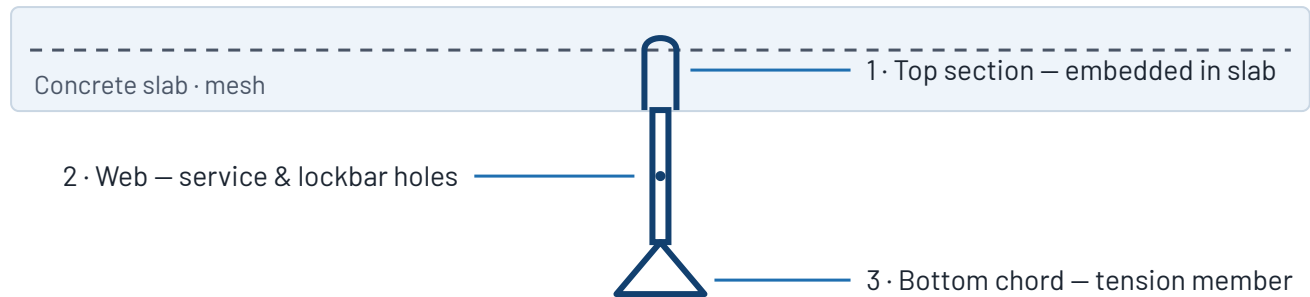
The joist is manufactured from G350, Z275 or Z450 pre-galvanised steel. The rollformed shape with its flanged holes produces a rigid, accurate steel section with a high load-carrying capacity – and therefore good spanning characteristics with no propping requirements.

TABLE 1 — JOIST WEIGHTS

SERIES JOIST	WEIGHT PER LINEAL METRE	CONCRETE WEIGHT PER M ² (90 MM)	TOTAL WEIGHT PER M ² WITH 90 MM CONCRETE
200	9.41 kg	216.54 kg	224.38 kg
250	10.59 kg	216.54 kg	225.37 kg
300	11.76 kg	216.54 kg	226.34 kg
350	12.94 kg	216.54 kg	227.32 kg
400	14.12 kg	216.54 kg	228.31 kg

03 — COMPONENTS

ANATOMY OF THE JOIST



SCHEMATIC ONLY — NOT TO SCALE

1 · TOP SECTION

The top section is embedded in the concrete slab and has four functions:

- 1 It is the compression element of the non-composite joist during construction.
- 2 It is a “chair” that supports the welded wire mesh or reinforcement, which develops negative moment capacity in the slab over the joist.
- 3 It locks in and supports the slab shuttering system (lockbar and Speedform tray).
- 4 It becomes a continuous shear connector for the composite system.

2 · WEB

The mid-section, or web, has the flanged service hole and the lockbar hole punched into it. Flanging the service hole stabilises the web, and services can pass through without protection from sharp edges. The 60 mm × 25 mm lockbar holes are punched at 150 mm pitch to receive the lockbars and give evenly distributed support to the Speedform tray.

3 · BOTTOM CHORD

The bottom triangular section acts as a tension member, both during construction and once the joist is acting compositely with the slab.

03 — COMPONENTS

LOCKBARS, FORMWORK & MESH

THE LOCKBAR

Lockbars support the Speedform tray between the joists during construction. Spaced approximately 300 mm apart, they engage in the slotted holes in the top section of the joist and maintain the exact joist spacing.

- Standard lockbars position joists at 1230 mm, 930 mm or 630 mm centres.
- Adjustable lockbars position joists in 50 mm increments from 330 mm up to 1530 mm.
- Other lockbar types cover special situations such as cantilevers or lowered soffits.

SPEEDFORM PERMANENT FORMWORK TRAY

Speedform structural steel decking is a highly effective, adaptable and strong formwork, reinforcement and ceiling system for Speedfloor suspended concrete floor slabs. It also acts as a permanent formwork solution with minimal propping, and is quick and easy to install, with excellent spanning capabilities for greater strength and less deflection.

Speedform is manufactured from pre-galvanised high-strength steel in a one-pass rollformer, giving a high degree of accuracy at a fast production rate. On site, the trays interlock easily and are placed between the Speedfloor joists, or used with traditional formwork frames and timbers to back-prop Speedform.

REINFORCING MESH

The mesh is laid out and tied into place. No chairs are required – it is held off the Speedform tray by the top section of the joist, which becomes embedded in the concrete.



03 — COMPONENTS

CONCRETE

Standard concrete must have a minimum 28-day strength of 25 MPa. Batch it at 60 mm slump and super-plasticise to 110 mm for good placement and shrinkage characteristics. Use a curing compound; an expanding agent can be introduced at the engineer's request to further control shrinkage during curing.

Place the concrete evenly and continuously over the formed area. Take particular care to screed and finish to the specified thickness so the designed deflections are achieved in the Speedfloor joists and the supporting structure.

04 — ACCESSORIES

ACCESSORIES

EDGE ANGLES — SpeedEdge is available in two heights (100 mm and 120 mm) with a holding-down clip that supports a perimeter bar. See the SpeedEdge brochure.

HANGING ANGLE — A galvanised steel angle with pre-punched lockbar holes, for use on structural steel beams and loadbearing walls parallel to the Speedfloor joists.

SPEEDFORM TRAY — Permanent steel formwork that also acts as reinforcement and ceiling. Its advantages:

- Structural permanent formwork.
- Fast and easy to install, with less handling required.
- Low-glare coating.
- Lower-profile ribs allow steel reinforcement to sit lower in the slab, so thinner slabs can be produced while still maintaining concrete cover to reinforcement.
- Can work as reinforcement in a composite slab, saving on concrete and reinforcement costs.

05 — DURABILITY

DURABILITY & SERVICEABLE LIFE

DURABILITY STATEMENT

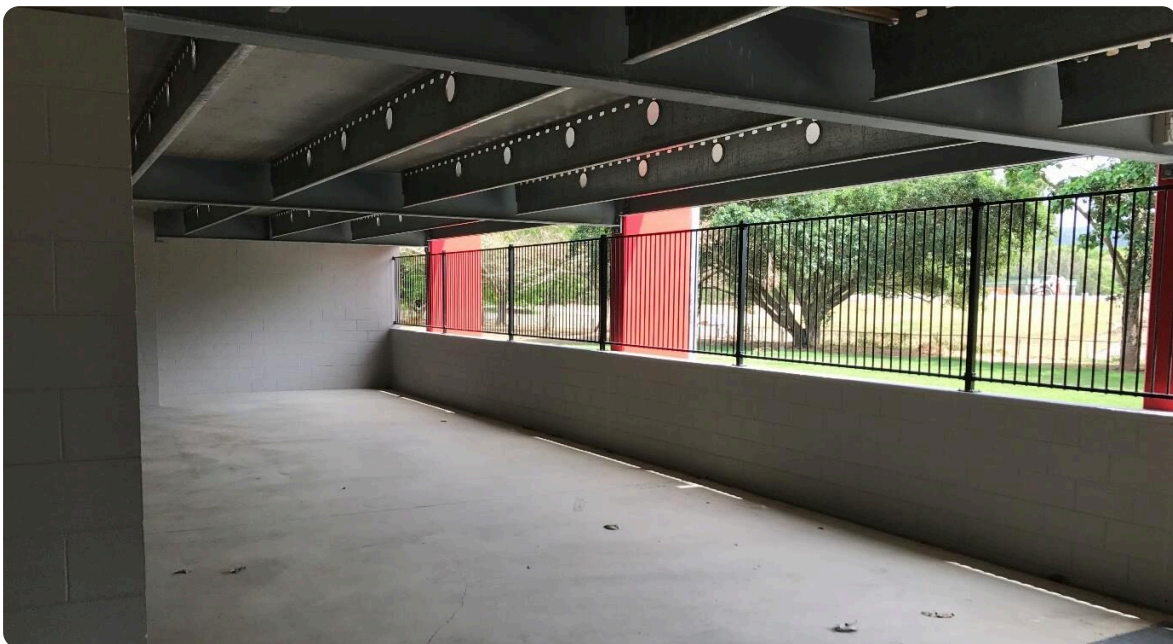
When supplied and installed in accordance with the manufacturer's specifications and design parameters, the Speedfloor suspended concrete flooring system can reasonably be expected to meet the performance criteria set out in the Building Code of Australia.

The durability of a galvanised coating depends on the thickness of the zinc coating, the general environment and the level of maintenance over the life of the product. Consider these factors when specifying Speedfloor to determine the longevity of the structural solution. For protective coatings and corrosivity zones, refer to AS/NZS 2312:2002 and AS/NZS 4680:2006.

If there is any doubt about Speedfloor's suitability in a corrosive zone, seek approval in writing – Speedfloor accepts no liability for the product other than when used in accordance with these recommendations.

SERVICEABLE LIFE

Speedfloor is a composite floor system using both steel and concrete. The two elements must be treated and maintained separately.



05 — SERVICEABLE LIFE

MAINTAINING STEEL & CONCRETE

STEEL

The rollformed joist is manufactured from steel with a Z350 zinc coating. In a clean, dry environment the joists need little or no maintenance. Where exposed, they need a minimum amount of maintenance to achieve the expected performance:

- 1 Keep surfaces clean and free from continuous contact with moisture, dust and other debris.
- 2 Periodically inspect the joists for signs of surface corrosion. Remove any corrosion by-products mechanically, spot-prime the exposed steel with an approved steel primer, and repaint with an appropriate paint to the manufacturer's recommendations.

CONCRETE

All calculations for the concrete slab are based on a density of 2350 kg/m^3 , a specified strength of 25 MPa and type A aggregate.

Particular attention is paid to the mix and placement of the concrete to minimise the likelihood of shrinkage cracks during the initial curing period. Slump is specified at 60 mm, and a super-plasticiser improves workability during placement. In carpark structures and exposed decks, an expanding agent is generally used to reduce the effect of shrinkage during the initial cure, and a curing compound helps control the curing process. If cracks appear during the service life of the floor, fill them with an approved epoxy injection system or equivalent to close the crack completely and prevent moisture ingress.



06 — DESIGN

DESIGN

Speedfloor has been designed to comply with NZS 3404: Parts 1 and 2: 1997, AS/NZS 4600:1996 and the Australian composite structures standard AS 2327 Parts 0 and 1, Structural Design Actions.

DESIGN PARAMETERS

Section properties and design parameters are calculated from the section geometry, supplementary full-scale tests and finite element analysis. Flanged service holes in the web assist web stiffening and provide practical services access. The joist is simply supported during construction, generally with no propping required; the concrete is cast in place and acts compositely with the joist.

Detailed analysis and comprehensive physical testing have established load-versus-span tables using limit state design philosophy. A load/span calculator is available on request from a Speedfloor representative or at speedfloor.com.au.

MATERIAL

Speedfloor joists are rollformed from zinc-coated steel coil conforming to AS 1397.

G400

Steel grade

420 MPa

Minimum tensile stress

Z350

Galvanised zinc coating

25 MPa

Minimum 28-day concrete strength (30 MPa for carparks)

Steel mesh reinforcement is placed at minimum cover (according to the durability requirements of NZS 3101 Section 3.11 and AS 3600), primarily for crack control caused by shrinkage during curing. Guidance on crack width tolerances is given in NZS 3101 and HERA report R4-113.

07 — FIRE

FIRE

Full-scale fire testing has established that the Speedfloor system can be fire rated to meet the requirements of the Australian and New Zealand building codes. Options for fire protection include:

A

A fire-rated suspended ceiling

B

Deemed-to-Satisfy (DTS): FRL determined by calculation from a tested prototype

C

A performance-based design method such as the Slab Panel Method

A — FIRE-RATED SUSPENDED CEILING

A fire-rated suspended ceiling installed below the Speedfloor system may also incorporate acoustic STC requirements. The floor/ceiling structure must meet structural adequacy, integrity and insulation requirements. Speedfloor has been fire tested in accordance with AS 1530.4-1990 Fire Resistance Tests of Elements of Construction, with the fire resistance of the structural specimen expressed in minutes. Contact your Speedfloor representative for more detail.

B — DEEMED-TO-SATISFY: FRL BY CALCULATION

Under NCC 2022 Volume One, Specification 1 clause S1C3, the FRL of a building element may be determined by calculation based on a tested prototype. For a Speedfloor floor:

- The floor may vary from the tested prototype in span, conditions of support and, to a minor degree, cross-section and components.
- The report must demonstrate by calculation that the floor would achieve the FRL under the Standard Fire Test for structural adequacy (including deflection), integrity and insulation.
- The calculations must take into account the temperatures reached by the prototype's components and their effect on strength and modulus of elasticity.

07 — FIRE (CONTINUED)

C — PERFORMANCE-BASED DESIGN

The Building Code is performance based: ‘Acceptable Solutions’ and ‘Approved Verification Methods’ that demonstrate compliance can be used by satisfying the code’s performance objectives.

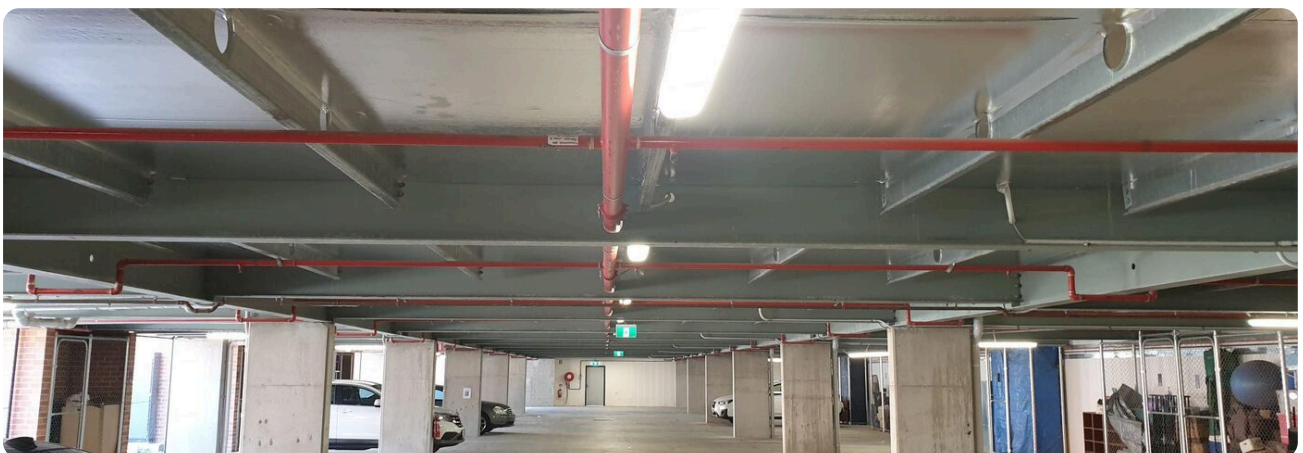
The Slab Panel Method (SPM), developed by the Heavy Engineering Research Association (HERA), is acknowledged as an acceptable method for establishing the performance of a steel structure during fire.

The procedure is based on the tensile membrane concept provided by in-slab reinforcement. Membrane action develops when slabs undergo large deflections with their edges vertically restrained, enhancing the slab’s load-carrying capacity. As the slab heats and the strength and stiffness of the concrete and reinforcing steel reduce, flexural yield lines form. With further temperature increase, the slab deflects vertically and membrane action develops to maintain the element’s structural stability.

SPM design for Speedfloor typically involves adding in-slab reinforcement in floors at risk of exposure to moderate or severe fire conditions.

SPM DESIGN SUPPORT

Speedfloor can provide the SPM design for your project, along with the SPM calculations for the Fire Design, to assist the design and consent stages of documentation and delivery. The program is also available from HERA and is described in HERA Steel Design and Construction Bulletin No. 71.



08 — FIRE DESIGN USING SPM

SPM PROGRAMME INPUT DATA

Input values specific to Speedfloor.

1 · MESH REINFORCEMENT COVER

$$C_{\text{mesh (y-direction)}} = t_0 - 38 - d_{\text{mesh}}$$

$$C_{\text{mesh (x-direction)}} = C_{\text{mesh (y-direction)}} - d_{\text{mesh}}$$

x-direction bars	Parallel to Speedfloor joists
y-direction bars	Perpendicular to Speedfloor joists
t_0	Slab thickness
38	Height of embedment of joist top flange into concrete (mm)
d_{mesh}	Diameter of mesh/bars

2 · MINIMUM $A_{R,\text{MESH}}$ REQUIRED FOR INTEGRITY

$$A_{rx,\text{mesh}} ; A_{ry,\text{mesh}} \geq 200 \cdot A_1(x \text{ or } y) \cdot A_2 \text{ (mm}^2\text{/m width)}$$

$$A_1 = S_{\text{mesh (x or y)}} \div 150 \geq 1 \cdot A_2 = (t_0 - h_{rc}/2) \div 110 \geq 1$$

$$150 \text{ mm} \leq S_{\text{mesh (x or y)}} \leq 250 \text{ mm}$$

A_1	Mesh bar spacing factor — 1 for mesh with nominal pitch of 75 mm or 150 mm
A_2	Slab effective depth factor — 1 for 90 mm or 75 mm topping
S_{mesh}	Mesh bar spacing (mm)
h_{rc}	0 for Speedfloor

3 · APPLIED LOAD

$$W^* = G + G_{\text{sdl}} + Q_u$$

Q_u	Uniformly distributed live load (ULS)
G	Uniformly distributed dead load
G_{sdl}	Superimposed dead load

08 — FIRE DESIGN USING SPM

REQUIREMENTS & WORKED EXAMPLE

SPEEDFLOOR-SPECIFIC REQUIREMENTS

Negative reinforcement is required over internal primary beams, as shown on the Speedfloor standard details (minimum 189 mm²/m).

If the SPM program requires interior support bars, provide these instead of the negative reinforcement. Interior support bars (typically 10 mm or 12 mm) sit on top of the upper mesh layer and extend $0.15 L_x + 600$ mm, where L_x is the slab dimension in the x direction (equal to the Speedfloor span).

Note: all reinforcement bars used in the SPM program should be Grade 500E.

WORKED EXAMPLE — 90 MM SLAB ACROSS TWO BAYS

Slab thickness 90 mm	L_x (joist span) 6.0 m	L_y 20.0 m	Fire rating 30 min	Applied load W 3.8 kPa	Fire load energy 400 MJ/m²
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✓ **REQUIRED: SL82 MESH + INTERNAL SUPPORT BARS N12 AT 300 MM CENTRES**

TABLE 2 — SPM OUTPUT SUMMARY

CHECK	CAPACITY	DEMAND	RESULT
Panel load-carrying capacity	w_u 4.25 kPa	w^* 3.8 kPa	Adequate
Shear through the slab	37.54 kN/m	11.4 kN/m	OK
Integrity — reinforcement area	—	—	Sufficient
Integrity — bar spacing, layer 1	—	—	Sufficient
Concrete compression check	—	—	Passed

09 — PERFORMANCE & SPECIFICATION

ACOUSTIC, VIBRATION & SPECIFICATION

ACOUSTIC

Guidelines for specifiers and constructors requiring noise control systems – for residential applications such as multi-unit dwellings, or for commercial applications – are available from Speedfloor in a separate Acoustic Design Guide produced by Marshall Day Acoustics Ltd. These guidelines are not intended to replace specialist acoustic design to meet a building's specified sound insulation performance.

For more on sound, its propagation, control and detailing, refer to the HERA Acoustic Guide, report no. R4-121.

VIBRATION

Floor structures are designed for ultimate limit state and serviceability limit state criteria. Ultimate limit state relates to strength and stability; serviceability limit states relate mainly to vibration, and are governed by stiffness, mass, damping and the excitation mechanisms. For slender floor structures, such as steel or composite floor construction, serviceability criteria can govern the design. Predicting vibration requires several dynamic floor characteristics to be determined. Design and assessment methods relate to human-induced resonant vibration, mainly caused by walking under normal conditions.

For a detailed explanation of floor vibration, refer to HERA reports R4-112 and R4-113.

SPECIFICATION — SUPPLY AND INSTALLATION

(a) Speedfloor or a Speedfloor agent shall supply all steel joists, components, labour, material and equipment relating to the installation of the Speedfloor suspended concrete floor system. Speedfloor steel joists and lockbars shall be manufactured and marked by Speedfloor or their authorised agent.

10 — SPAN TABLE

QUICK SELECTION REFERENCE SPAN TABLE

HOW TO USE THIS TABLE

- 1 Calculate the total applicable live load.
- 2 Determine the largest acceptable joist depth.
- 3 Select the relevant slab thickness.
- 4 Start with 1230 mm centres.
- 5 Scan along the row to the relevant total live load.
- 6 This is the maximum span for the selected criteria.

Tables assume a superimposed dead load of 0.5 kPa. A load-versus-span calculator is available from Speedfloor for more detailed design.

TABLE 3 — MAXIMUM SPANS BY JOIST SERIES, TOPPING AND SPACING

SERIES	TOPPING (MM)	JOIST C/C (MM)	MAXIMUM SPAN (M) AT LIVE LOAD						
			1.5 KPA	2.5 KPA	3.0 KPA	4.0 KPA	5.0 KPA	6.0 KPA	7.0 KPA
SF200	120	1230	4.40	4.38	4.36	4.23	4.20	4.10	4.00
	90	1230	4.60	4.55	4.50	4.40	4.38	4.20	4.05
	120	930	4.90	4.80	4.75	4.70	4.60	4.55	4.50
	90	930	5.20	5.05	4.95	4.80	4.75	4.65	4.55
SF250	120	1230	5.60	5.45	5.40	5.35	5.20	4.90	4.70
	90	1230	5.90	5.78	5.65	5.60	5.10	4.85	4.60
	120	930	6.30	6.10	6.00	5.90	5.80	5.35	5.20
	90	930	6.60	6.45	6.40	6.20	5.80	5.55	5.30
SF300	120	1230	6.65	6.60	6.50	6.45	6.30	5.75	5.60
	90	1230	7.05	6.85	6.80	6.65	6.20	5.75	5.50
	120	930	7.30	7.20	7.15	6.95	6.80	6.70	6.40
	90	930	7.70	7.60	7.50	7.30	7.10	6.55	6.30
SF350	120	1230	7.30	7.20	7.15	7.10	7.05	6.70	6.40
	90	1230	7.90	7.75	7.70	7.55	7.20	6.75	6.45
	120	930	8.15	8.00	7.90	7.75	7.70	7.55	7.40
	90	930	8.60	8.40	8.35	8.15	7.95	7.75	7.30
SF400	120	1230	8.05	7.90	7.70	7.05	6.60	6.30	5.80
	90	1230	8.50	8.30	7.80	7.20	6.70	6.35	5.90
	120	930	8.75	8.65	8.60	8.20	7.65	7.20	6.70
	90	930	9.30	9.00	8.85	8.30	7.70	7.15	6.70

11 — PROPERTIES & CAPACITIES

PROPERTIES & CAPACITIES

Speedfloor with a 90 mm concrete slab.

TABLE 4 — SECTION PROPERTIES

JOIST SERIES (MM)	NON-COMPOSITE				COMPOSITE		
	I_{ST} ($\times 10^6$ MM ⁴)	Z_T ($\times 10^3$ MM ³)	Z_B ($\times 10^3$ MM ³)	I_{COMP} ($\times 10^3$ MM ⁴)	Z_T ($\times 10^3$ MM ³)	Z_B ($\times 10^3$ MM ³)	I_{EFF} FOR DEFLECTION ($\times 10^6$ MM ⁴)
200	8.14	65.00	72.00	35.20	633.00	150.70	31.20
250	14.00	92.90	101.90	43.30	798.20	155.70	39.70
300	20.40	108.00	136.00	67.70	1130.00	205.00	60.40
350	28.70	129.00	173.00	96.30	1488.40	256.60	86.00
400	38.10	160.60	189.70	99.00	1578.90	231.60	89.90

TABLE 5 — SECTION CAPACITIES

JOIST SERIES (MM)	NON-COMPOSITE			COMPOSITE		
	SHEAR, WITH HOLES ϕV_V (KN)	SHEAR, WITHOUT HOLES ϕV_V (KN)	ϕM_{SX} (KN·M)	SHEAR, WITH HOLES ϕV_{RC} (KN)	SHEAR, WITHOUT HOLES ϕV_{RC} (KN)	ϕM_{RC} (KN·M)
200	NA	71.00	20.50	NA	73.00	47.80
250	30.20	100.00	29.30	32.60	102.20	43.30
300	42.00	85.00	34.00	44.00	87.00	64.00
350	60.00	72.00	40.60	62.00	74.00	86.00
400	30.20	62.00	50.50	32.60	64.40	74.40

NA — the 200 series joist has no service holes.

12 — NOTES & DEFLECTION

NOTES, ASSUMPTIONS & DEFLECTION

TABLE 6 — ASSUMPTIONS RELATING TO PROPERTIES AND CHARTS

ASSUMPTION	VALUE
Steel joist yield strength f'_y	400 MPa
Steel thickness	3 mm
Concrete strength	25 MPa (32 MPa for car parks and commercial buildings)
Joist spacing	1230 mm, 930 mm and 630 mm
Typical slab topping	90 mm
End-bolted support bracket capacity (limit state)	200 series: 48 kN · 250–400 series: 77 kN
First service hole	Minimum 1300 mm from edge of support
Service holes	200: none · 250–350: 130 mm dia. · 400: 250 mm dia.
Camber	All joists are pre-cambered

DEFLECTION

Deflection is an important consideration in any design. The Speedfloor deflection charts give options for the deflection the designer may deem acceptable in the joist, but the total deflection of the floor system – support beams and flooring system together – must be considered to meet in-service code requirements.

CRITERIA — AS/NZS 1170.0:2002 TABLE C1, MODIFIED FOR COMPOSITE CONSTRUCTION

A) Normal floor system, to control noticeable sag

$$\Delta G_c - \Delta_{pc} + \Delta_{shr} + \Delta G_s + \Delta \psi_s Q + \Delta_{cr} = L/360$$

B) Floors with line of sight along the invert, to avoid damage to susceptible wall or ceiling finishes

$$\Delta G_c - \Delta_{pc} + \Delta_{shr} + \Delta G_s + \Delta \psi_e Q + \Delta_{cr} = L/500$$

- Charts use a short-term live load factor of 0.7 for the L/360 limit and a long-term factor of 0.4 for the L/500 limit.
- Each chart's deflection table shows total deflection of $\Delta G_s + \Delta_{pc} + \Delta_{shr} + \Delta G_s + \Delta_{cr}$, with G_{sdl} based on 0.5 kPa.

12 — DEFLECTION (CONTINUED)

ADJUSTING FOR SUPERIMPOSED DEAD LOAD

Where the superimposed dead load (G_{sdl}) exceeds 0.5 kPa, calculate the deflection due to the difference and add it to the total deflection.

EXAMPLE — 400 JOIST · 90 MM TOPPING · 1230 MM SPACING · 7.0 M SPAN · G_{sdl} 1.10 KPA

Additional $G_{sdl} = 1.10 - 0.50$	0.60 kPa
ΔG_s for 0.5 kPa	1.07 mm
ΔG_s for 0.6 kPa = $1.07 \times (0.6 \times 1.23) \div (0.5 \times 1.23)$	1.29 mm
Total deflection = 4.58 mm + 1.29 mm	5.87 mm

TABLE 7 — NOTATIONS

SYMBOL	DESCRIPTION	UNITS
Δ_{pc}	Speedfloor precamber	mm
Δ_{cr}	Deflection due to creep	mm
ΔG_c	Deflection due to wet concrete & self-weight in the non-composite section	mm
Δ_{shr}	Deflection due to shrinkage	mm
ΔG_s	Deflection due to superimposed dead load	mm
$\Delta \psi_s Q$	Deflection due to short-term live load	mm
$\Delta \psi_e Q$	Deflection due to long-term live load	mm
G	Uniformly distributed dead load	kPa
G_{sdl}	Uniformly distributed superimposed dead load	kPa
Q	Uniformly distributed live load	kN/m
I_{st}	Second moment of area of steel alone	mm ⁴
I_{comp}	Second moment of area of composite section transformed into equivalent steel section	mm ⁴
I_{eff}	Effective second moment of area	mm ⁴
$\emptyset M_{rc}$	Nominal moment capacity of a composite section	kN·m
$\emptyset M_{sx}$	Nominal moment capacity of a non-composite section	kN·m
$\emptyset V_{rc}$	Nominal shear capacity of a composite section	kN
$\emptyset V_v$	Nominal shear capacity of a non-composite section	kN
Z_b	Effective section modulus of Speedfloor bottom chord	mm ³
Z_t	Effective section modulus of Speedfloor top chord	mm ³

13 — DESIGN EXAMPLES

DESIGN EXAMPLES

The design calculator allows for 0.5 kPa superimposed dead load; any additional superimposed dead load is treated as live load. It uses a load combination of $1.2G + 1.5Q$ for strength, $\psi_s = 0.7$ for the $L/360$ deflection limit and $\psi_e = 0.4$ for $L/500$. All examples use 1230 mm joist spacing and 90 mm topping.

EXAMPLE 1 — RESIDENTIAL FLOOR

Live load $Q = 2.0$ kPa

 $G_{sdl} = 0.5$ kPa

JOIST	MAX SPAN	LIMITED BY
250 mm	5.85 m	Deflection $L/360$ and/or strength
400 mm	8.35 m	Deflection $L/360$ and/or strength

EXAMPLE 2 — RETAIL FLOOR

Live load $Q = 4.0$ kPa

 $G_{sdl} = 2.5$ kPa

Treat the additional 2.0 kPa ($2.5 - 0.5$) of superimposed dead load as live load.

Strength: $4.0 + (2.0 \times 1.2 \div 1.5)$ 5.6 kPa

Deflection $L/360$: $4.0 + (2.0 \times 1.0 \div 0.7)$ 6.85 kPa

Deflection $L/500$: $4.0 + (2.0 \times 1.0 \div 0.4)$ 9.0 kPa

JOIST	MAX SPAN	LIMITED BY
250 mm	4.5 m	Deflection $L/360$ and/or strength
400 mm	5.8 m	Deflection $L/360$ and/or strength

As the load exceeds 5.0 kPa, the slab topping requires specific design (for 5.6 kPa) by a Speedfloor engineer.

13 — DESIGN EXAMPLES (CONTINUED)

EXAMPLE 3 — OFFICE FLOOR

Live load $Q = 3.0 \text{ kPa}$

$G_{sdl} = 1.1 \text{ kPa}$

Treat the additional 0.6 kPa of superimposed dead load as live load.

Strength: $3.0 + (0.6 \times 1.2 \div 1.5)$ **3.5 kPa**

Deflection L/360: $3.0 + (0.6 \times 1.0 \div 0.7)$ **3.85 kPa**

Deflection L/500: $3.0 + (0.6 \times 1.0 \div 0.4)$ **4.5 kPa**

JOIST	MAX SPAN	LIMITED BY
250 mm	4.90 m	Deflection L/500
250 mm	5.45 m	Deflection L/360 and/or strength
400 mm	7.30 m	Deflection L/360 and/or strength

14 — REFERENCES

REFERENCES

TABLE 8 — REFERENCED STANDARDS AND PUBLICATIONS

STANDARD	PART	TITLE
AS/NZS 4600:1996	—	Cold-formed Steel Structures
AS/NZS 4600:1998	—	Cold-formed Steel Structures — Commentary Supplement 1
AS/NZS 1170	Part 0	Structural Design Actions
AS/NZS 1170	Part 1	Structural Design Actions
AS 2327:1996	Part 1	Australian Composite Structures Standard
HERA publication	No. 71	SPM software for design of floor slab panels for dependable inelastic response to severe fire

15 — PROJECTS

ZERO BACK-PROPPING — SEE THE DIFFERENCE



SPEEDFLOOR — NO BACK-PROPPING



TRADITIONAL SLAB — BACK-PROPPED

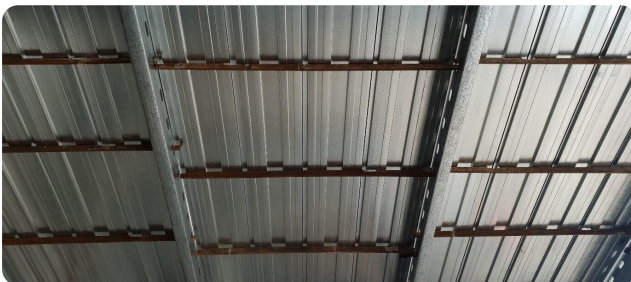
ON SITE



FINISHED SOFFIT



SPEEDFORM TRAY DURING INSTALL



UNDERSIDE WITH SPEEDFORM TRAY



SERVICES THROUGH THE JOIST



TALK TO A SPEEDFLOOR CLIENT MANAGER

GET A LOAD/SPAN CALCULATION FOR YOUR PROJECT

A load-versus-span calculations are available on request from your Speedfloor Client Manager, along with fire design support. Or visit speedfloor.com.au and click the resources tab to access the calculator.

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