FINNFRAME FLOOR SYSTEM

MetsäWood

A COMMITMENT TO THE ENVIRONMENT

The environmental credentials of Metsä Wood's Finnframe System are without parallel. Finnframe satisfies the most stringent requirements for sustainability.

Our commitment to renewable resources begins with the 130,000 private Finnish forest owners from whom we procure most of our timber. At every stage thereafter we control distribution, manufacture and sales of our products. That unbroken chain from sapling to selling gives us an unrivalled ability to trace the source of timber products.

We take our environmental responsibilities as seriously as you do. We hold full Chain of Custody and environmental certification under PEFC for every Finnjoist (FJI) and Kerto® product that we supply. That's why you can rely on Finnframe - and on the Finnjoist (FJI) that supports it all - for the reassurance that you and your clients demand.

If you are involved in government or local authority projects, or if you have your own strong environmental charter, you only have to specify Finnjoist (FJI) to meet current standards, including the latest Government Timber Procurement Policies.

CONTENTS

FINNFRAME© FLOOR SYSTEM

A SINGLE, STANDARDS-COMPLIANT SOLUTION GUIDES YOU FROM DRAWING BOARD TO FINISHED BUILDING

The Finnframe Floor System does the job of specifying for you. It converts your own floor plans into a 3-D image of the supporting structure together with a complete bill of materials and detailed plans for construction. Those plans go with our Finnjoists and other engineered wood products to provide a comprehensive drawing-board to building-site flooring system.

The Finnframe Floor System is an inspired mix of quality, technology and service - a total flooring system devised specifically for the UK construction industry. It was the first flooring system to comply with Eurocode 5.

FULLY ENGINEERED FOR BETTER PERFORMANCE

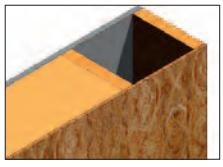
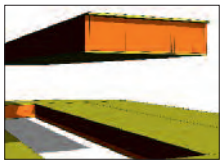
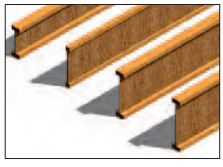
Engineered and factory produced to give uniform strength, rigidity, size and weight, our engineered wood products out-perform traditional solid wood construction. Produced at reduced moisture content our engineered wood products are some of the most stable on the market today. Our Finnjoist is a prime example, with a high quality OSB web and flanges made of our own Kerto® (LVL), delivering less dimensional change over time, virtually eradicating floor movement and its associated problems, resulting in greater floor performance.

BUILDING INFORMATION MODELLING

TIMBER ENGINEERING THROUGH BIM

The Government Construction Strategy Report has stated that all suppliers that wish to bid for public sector building contracts must use BIM tools and techniques from 2016. Organised into BIM families, our key engineered wood product systems and solutions are all available.

The key driver of our BIM strategy is to facilitate the wider specification of EWP systems and solutions by making them readily available as free downloads. Launched in Revit, our BIM components can be downloaded at metsawood.co.uk or bimstore.co.uk. For further information, please contact our technical team via bimuk@metsagroup.com


CE 1224-CPD-0001

ETA 02/0026

BM TRADA Engineered Wood Products QM 36/003

PEFC

QUALITY ASSURED UKTFA

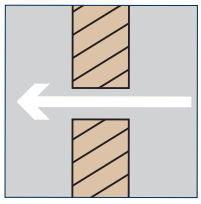
FINNFRAME© ENERGY EFFICIENCY

ENERGY EFFICIENCY: PSI [Ψ] VALUE

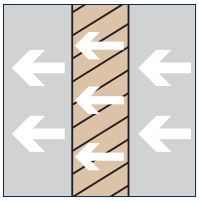
Every new build property needs to have a Standard Assessment Procedure (SAP) assessment of the energy efficiency of the unit. By specifying Finnframe®, the housebuilder is able to gain over 91%* greater energy efficiency.

*WHEN COMPARING FINNFRAME'S PSI(Ψ) AND DEFAULT 'Y' VALUE CALCULATION

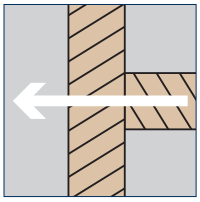
A HEATED BUILDING CAN LOSE HEAT (ENERGY) IN 3 WAYS:



Through holes in the **regular fabric: [air leakage]**



Through the **fabric** of the building: **[u values]**



Through **cold bridges** between building elements like roof/wall, wall/floor, etc: **[Ψ value]**

SAP CALCULATION = ENERGY EFFICIENCY RATING

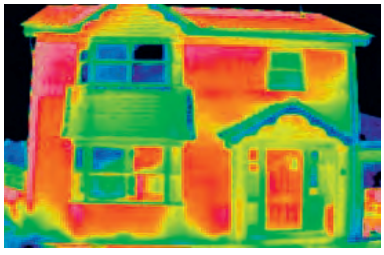
The SAP analysis for a building requires that the 3 values (air leakage, u-values, psi values) are calculated in order to determine its efficiency (energy consumption)

- *Air leakage is measured with a 'blower door test'*
- *U-values are calculated depending on the materials used in the element or sometimes certified in the case of element components (i.e. windows, doors, etc.)*
- *Cold bridges Psi-value are defined by either default values, accredited details values or thermal modelling*

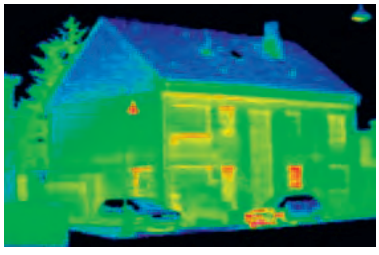
FINNFRAME CAN POINT TO THE RESULTS OF THE THERMAL MODELLING UNDERTAKEN

THE HOUSE BUILDER CAN SAVE ON

- *Costs and improve the SAP rating of its units*
- *Potential to offset the Finnframe PSi values in the SAP calculation against other building elements, for example windows or insulation*



HIGH ENERGY LOSS

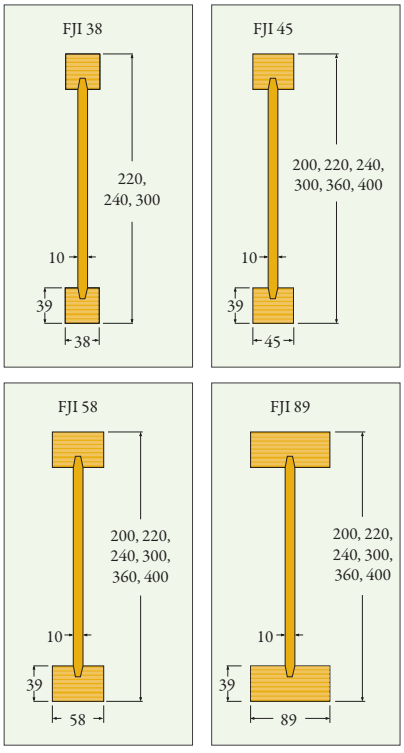


WITH IMPROVED ENERGY EFFICIENCY

FINNJOIST (FJI)

Finnjoist (FJI), forms the heart of our floor system. Manufactured in the UK at our purpose-built factory in King's Lynn to exacting tolerances, the Finnjoist (FJI) with its Kerto® flange and high quality OSB web has a high strength to weight ratio and therefore produces lighter, longer spans combined with quick and easy installation so reducing your build time and increasing efficiency. Finnjoists have full 3rd party accreditation through the BM Trada Q-Mark and are the first product on the market to gain the European Technical Approval (ETA) and the CE mark.

A Flange manufactured from Kerto®. B Web manufactured from high quality OSB.



Standard Finnjoist sizes.

CE marked for today

Being produced from technically advanced products and rigorously tested means our Finnjoist (FJI) has been accredited with the CE mark.

The Construction Products Regulation came into force on 1 July 2013. To find out more about CE marking and how it affects your business visit us on: www.metsawood.co.uk/company/legislation

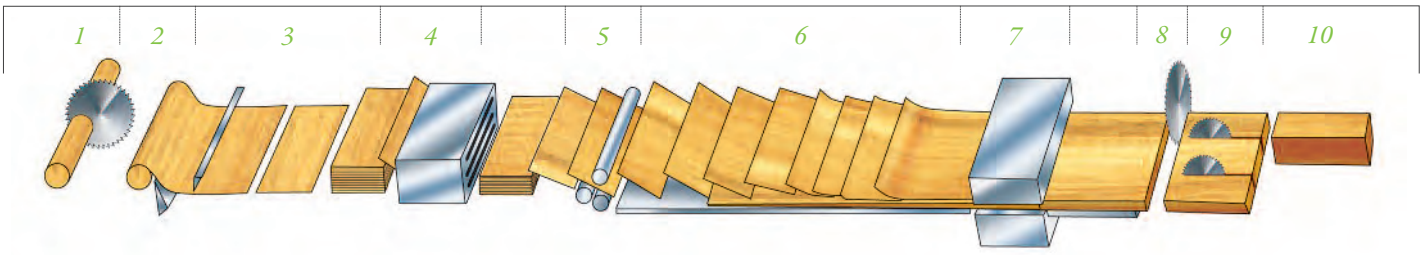
CE 1224-CPD-0001

BM TRADA Engineered Wood Products QM 36/003

ETA 02/0026

KERTO®

Manufactured by Metsä Wood since 1975, our Kerto® is a unique product which not only serves as the flange material for our (FJI) I-Joists but is the perfect choice for long spans, rimbeams, lintels and high-load structural applications. Kerto® is CE marked, carries BBA certification and PEFC environmental accreditation.



Kerto is produced from rotary-peeled 3mm graded softwood veneers, which are then glued together to form a continuous 1.8 or 2.5 metre wide product. The 21mm to 90mm thick sheets are then further machined to the finished dimensions.

The result is an engineered wood product that maintains the natural beauty of wood whilst being strong enough for most types of construction applications.

1 Sawing
2 Rotary Peeling
3 Clipping
4 Drying
5 Gluing
6 Layup
7 Hot Press
8 Cross-cutting
9 Rip-sawing
10 Despatching

There are two key types of Kerto®:

KERTO-S

Produced so that all its veneers are laid with the grain in the same direction, Kerto-S delivers a product perfect for beams whatever the specification and for achieving long spans with minimal deflection. Kerto-S (up to a maximum thickness of 75mm) is coated with Metsä Wood's WeatherGuard. Please contact Metsä Wood Technical Support for further information.

KERTO-Q

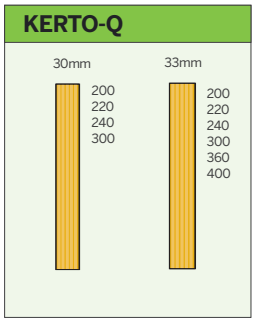
Produced in a similar way to Kerto-S but with approximately 20% of its veneers laid crossways, Kerto-Q delivers exceptional dimensional stability and performs well where high compression strength is required. Kerto-Q is ideal as a rimboard in timber frame construction.

KERTO-S WITH LONGITUDINALLY LAID VENEERS

KERTO-Q WITH CROSS LAID VENEERS

KERTO-S

KERTO-Q



NOTES:

1. Kerto-S is supplied WeatherGuard coated with the exception of 90mm which is supplied uncoated.
2. Kerto® is supplied with unsanded faces.
3. Other sizes and finishes are available to special order. Please contact Metsä Wood Technical Support 01205 883 835.

CE

NO 09/G010

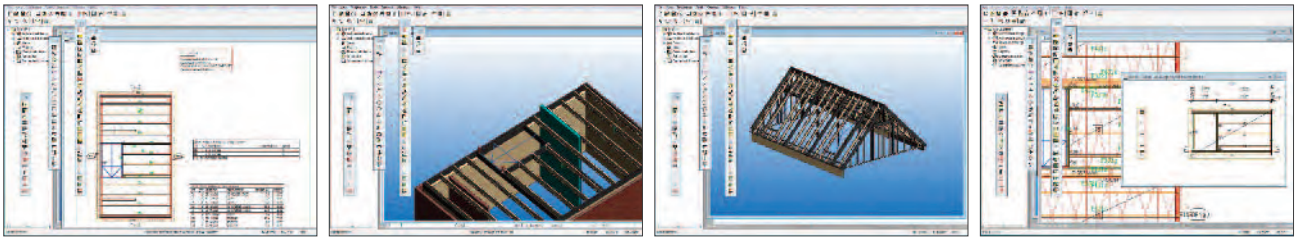
PEFC

SOFTWARE & TECHNICAL SUPPORT

TECHNICALLY ADVANCED

Simple to use, giving you the advantage

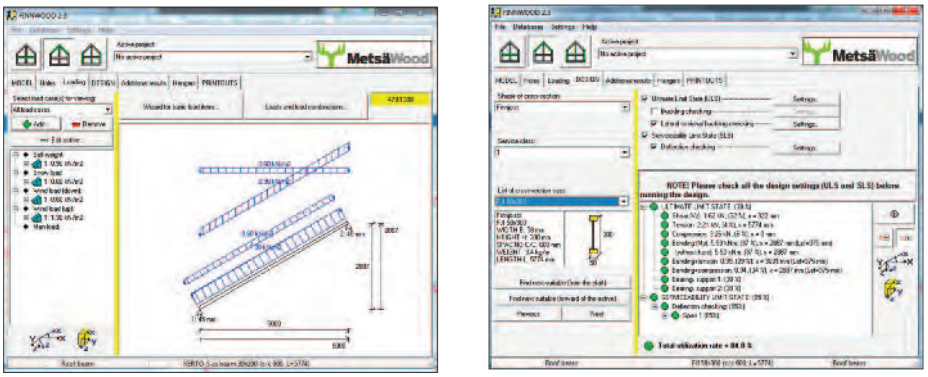
A programme of continuous development and advancement has given us the Finnframe software package, allowing you to view designs in 3D as well as plan view. Finnframe will deliver clear and concise material listings, structural and assembly drawings, and is designed to calculate to BS EN 1995-1-1. Finnframe is also able to link with other software programs including drafting, stock control and CNC cutting programs, a feature unique to Finnframe. Finnframe will link to our cutting optimisation program, Finncut, to help reduce waste.



* Finnframe is exclusively for use by our qualified distributors

FINNWOOD

To complement the Finnframe software used by our trained distributors, Finnwood, our single member calculation software is freely available on our website www.metsawood.co.uk/buildingconstruction/designtools With a simple user interface, Finnwood will give a fully detailed analysis of any structural member required in the construction of your floor. Despite this ease of use, Finnwood provides the user with the ability to input additional loads and alter loadings to suit their needs. With the introduction of BS EN 1995-1-1, Finnwood will provide an output suitable for use with both Ultimate Limit State (EC5) and Allowable Stress Design (BS5268) calculations.



TECHNICAL SUPPORT

In addition to the hardware and software, our package is completed with the support of our UK based Technical Support Team and Technical Sales Team, providing technical advice, troubleshooting, training and giving you all the support required to complete your project.
For more information on the above please contact our Support Team on 01205 883 835.

FINNJOIST (FJI) DESIGN VALUES

FINNJOIST (FJI)

LONG TERM DESIGN VALUES TO BS5268, SERVICE CLASS 1

JOIST TYPE	WEIGHT	MOMENT CAPACITY	MOMENT CAPACITY LOAD SHARE	FLEXURAL RIGIDITY	SHEAR RIGIDITY	SHEAR CAPACITY	SHEAR CAPACITY LOAD SHARE	END BEARING, LOAD SHARE 45mm		INTERMEDIATE, LOAD SHARE 89mm	
								NS	S	NS	S
	Kg/m	kNm	kNm	$Nmm^2 \times 10^9$	$N \times 10^6$	kN	kN	kN	kN	kN	kN
200-45	2.64	3.64	3.78	309	1.18	4.50	4.68	4.41	5.21	8.75	9.55
200-58	3.16	4.78	4.97	402	1.18	4.79	4.99	5.38	6.19	10.69	11.49
200-89	4.42	7.43	7.72	622	1.18	4.95	5.15	6.40	7.21	12.71	13.51
220-38	2.48	3.39	3.53	327	1.34	5.05	5.25	3.88	4.68	7.70	8.50
220-45	2.76	4.09	4.25	390	1.34	5.23	5.44	4.41	5.21	8.75	9.55
220-58	3.29	5.37	5.58	506	1.34	5.57	5.80	5.38	6.19	10.69	10.69
220-89	4.55	8.33	8.66	784	1.34	5.76	5.99	6.40	7.21	12.71	13.51
240-38	2.61	3.77	3.92	403	1.50	5.65	5.87	3.88	4.68	7.70	8.50
240-45	2.89	4.54	4.72	480	1.50	5.85	6.08	4.41	5.21	8.75	9.55
240-58	3.42	5.96	6.20	623	1.50	6.23	6.48	5.38	6.19	10.69	11.49
240-89	4.68	9.24	9.61	964	1.50	6.44	6.69	6.40	7.21	12.71	13.51
300-38	2.99	4.94	5.13	680	1.98	6.82	7.09	3.88	4.68	7.70	8.50
300-45	3.28	5.93	6.17	810	1.98	7.06	7.35	4.41	5.21	8.75	9.55
300-58	3.80	7.76	8.07	1050	1.98	7.52	7.82	5.38	6.19	10.69	11.49
300-89	5.06	12.00	12.48	1622	1.98	7.77	8.08	6.40	7.21	12.71	13.51
360-45	3.66	7.36	7.65	1230	2.46	7.97	8.29	4.41	5.21	8.75	9.55
360-58	4.19	9.61	9.99	1592	2.46	8.49	8.82	5.38	6.19	10.69	11.49
360-89	5.45	14.80	15.40	2456	2.46	8.76	9.11	6.40	7.21	12.71	13.51
400-45	3.92	8.33	8.66	1562	2.78	9.09	9.46	4.41	5.21	8.75	9.55
400-58	4.44	10.86	11.29	2020	2.78	9.68	10.07	5.38	6.19	10.69	11.49
400-89	5.70	16.70	17.36	3111	2.78	10.00	10.40	6.40	7.21	12.71	13.51

NOTES:

1. The design values presented are for Service Class 1.
   Typical Service Class 1 applications are intermediate floors in heated dwellings and commercial buildings. For other applications, please contact Metsä Wood Technical Support (01205 883 835).
2. The design values are for use with BS5268 and are applicable to long term load duration. Design values are according to BM TRADA Q-mark approval schedule no: 36/003.
3. Standard Single Span Deflection calculations are to include shear deflection, i.e.

$$W_{inst} = \frac{5FL^4}{384 \cdot EI} + \frac{FL^2}{8GA}$$

W_{inst} = Deflection (mm)
F = Total Load (kN/m)
L = Design span (mm)
EI = Flexural rigidity (Nmm^2)
GA = Shear rigidity (N)

4. Minimum end bearing length should be taken as 45mm.
5. Minimum interior bearing length should be taken as 89mm.
6. For full moment capacity the compression flange must be restrained at 300mm centres. For alternative restraint centres please contact Technical Support.
7. Please contact Technical Support for Service Class 2.
8. NS = No Web Stiffener at support.
   S = Web Stiffener at support.

FLOOR PERFORMANCE

GENERAL FLOOR PERFORMANCE

The performance of a floor is a subjective matter, expectations differ significantly between individuals. The main performance criteria being quietness and amount of deflection. Minimum standards are governed by current legislation but may not give the personal expected performance. The most important factor influencing floor performance is stiffness. Improving stiffness decreases deflection, bounce and vibration.

IMPROVING FLOOR PERFORMANCE

FLOOR STIFFNESS CAN BE IMPROVED BY:

Glued and fixed decking	Improves composite action of joist and deck
Deeper joists and/or larger flanges	Improves joist stiffness
Smaller joist spacing	Improves floor stiffness
Strutting in perpendicular direction of the span	Improves floor stiffness perpendicular to joists Helps floor to act as a system
Double or multiple spans	Decreases deflection Care should be taken when designing continuous joists There is the possibility of vibration being transmitted between compartments (such as from room to room in a hotel)

Stiffness The ability of a material to resist deflection under load.
Vibration Resonance of material. In floors mainly due to induced loads like walking.
Another factor in performance is the mass of the floor. Increasing the mass improves the impact sound properties of floors. However, a floor with low stiffness and a high mass can lead to vibration problems.

FINNFRAME FLOOR DESIGN

Finnframe floor design is based on three elements according to BS EN 1995-1-1 design methods.

- *Strength under maximum ultimate limit state design loads.*
- *Deflection under serviceability limit state loads.*
- *Floor vibration control by:*
  - *limiting the deflection under 1kN point load.*
  - *limiting the lowest natural frequency to eliminate resonance.*

FLOOR PERFORMANCE CLASSES

Finnframe floor design has 2 performance classes:

Finnframe Standard 12 Class
Meets the requirements of the Building Regulations and the requirements of the NHBC Standards chapter 6.4.

Finnframe 12+ Class
Meets the requirements of the Building Regulations, the requirements of the NHBC Standards Chapter 6.4 and BS EN 1995-1-1 including vibration control and long-term deflection

PROPERTY	FINNFRAME STANDARD 12 CLASS	FINNFRAME STANDARD 12 + CLASS
w_{inst} =	L/333 or 12mm	L/333 or 12mm
$w_{net,\ fin}$ =	L/200	L/250
w1 kN point load	-	as per National Annex NA Clause 2.7 of BS EN 1995-1-1:2004+A1:2008
Lowest natural frequency f_1	-	>8 Hz

w_{inst} =	Static deflection under instantaneous load (dead and live load combined).
$w_{net,\ fin}$ =	Static deflection under instantaneous deflection and deflection due to creep deformation.
w1 kN point load	Static deflection under 1kN point load.

WEIGHTS OF MATERIAL

In any floor design the weights of the applied loads must be calculated. The permanent loads or dead loads are those that form the structure and finishes. The imposed or live loads are those considered appropriate for the use of the floor such as furniture or human foot traffic. Live load information can be obtained from BS EN1991-1-1

SCHEDULE OF MATERIAL DEAD WEIGHTS

FLOOR DECKING	kN/m²
18mm Chipboard	0.13
22mm Chipboard	0.16
15mm OSB	0.11
18mm OSB	0.13
15mm Plywood	0.10
19mm Plywood	0.12
16mm S.W. Boarding	0.08
19mm S.W. Boarding	0.10
22mm S.W. Boarding	0.11

Chipboard refers to moisture resistant chipboard P4 and P5 to BS EN 312. OSB 3 to EN 300.

Plywood to be to the requirements of BS5268 part 2.

CEILING FINISHES	kN/m²
5mm Plaster Skim	0.06
12.5mm Plasterboard	0.12
15mm Plasterboard	0.14
19mm Plasterboard	0.18
12.5mm Fire Check Board	0.12

PARTITION LOADS	kN/m²
12.5mm Plasterboard on both sides of the timber	0.29

INSULATION	kN/m²
Glass Wool Slab per 25mm depth	0.01
Glass Wool Quilt per 25mm depth	0.02

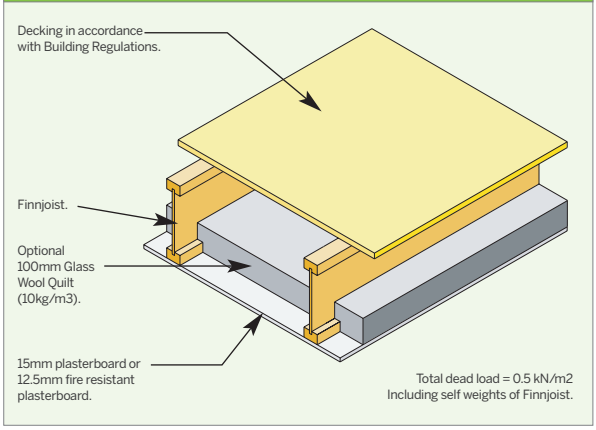
DESIGN OF FLOORS

The weight of the construction together with the proposed live load is added together to form the total uniform distributed floor loads assumed to be acting over the full floor area. The use of the span tables can be adopted to select the appropriate Finnjoist profile section that can safely carry the uniform load. For intermediate floors in heated homes Service Class 1 can be expected.

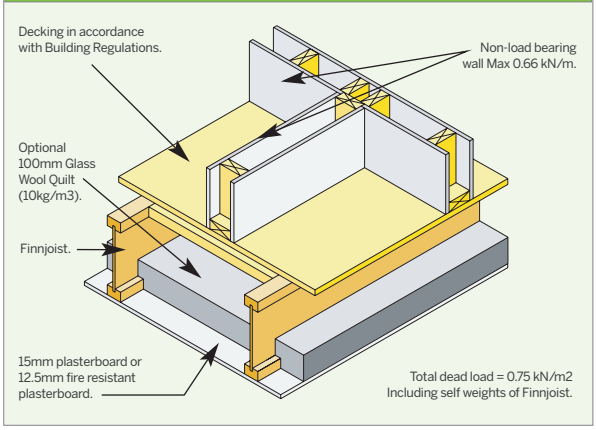
The span tables provide joist profiles that match the span to load based on a number of key design criteria from strength, deflection limits and vibration limits. Metsä Wood recommend the higher floor performance classes for improved performance and greater user satisfaction.

TYPICAL FLOOR CONSTRUCTION DETAILS AND WEIGHTS

DOMESTIC FLOOR (NO PARTITIONS ABOVE)



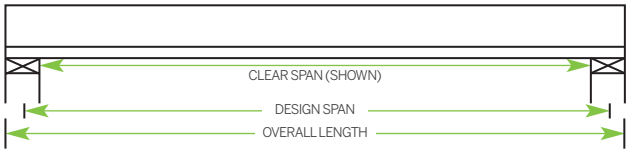
DOMESTIC FLOOR (NON-LOAD BEARING PARTITIONS ABOVE)



FINNJOIST (FJI) SPAN TABLE

INTERMEDIATE FLOOR 0.75kN/m² DEAD LOAD ALLOWANCE

Standard domestic floor condition with allowance for non-load bearing partitions up to 0.66kN/m.
Maximum clear span (L) for single span conditions.
Performance classes as defined on page 10.



FJI	FINNFRAME 12 STANDARD				FINNFRAME 12+			
	600	480	400	300	600	480	400	300
200-45	3.545	3.845	4.065	4.385	3.495	3.745	3.945	4.185
200-58	3.855	4.125	4.325	4.675	3.795	4.035	4.195	4.455
200-89	4.295	4.565	4.795	5.185	4.295	4.495	4.655	4.925
220-38	3.635	3.945	4.135	4.465	3.595	3.835	4.015	4.265
220-45	3.845	4.105	4.315	4.655	3.795	4.025	4.185	4.435
220-58	4.115	4.375	4.585	4.955	4.115	4.275	4.445	4.715
220-89	4.555	4.835	5.085	5.495	4.555	4.755	4.925	5.215
240-38	3.905	4.155	4.365	4.705	3.865	4.075	4.235	4.485
240-45	4.085	4.335	4.545	4.905	4.075	4.245	4.405	4.675
240-58	4.335	4.605	4.835	5.225	4.335	4.505	4.675	4.965
240-89	4.795	5.105	5.365	5.795	4.795	5.005	5.185	5.485
300-38	4.475	4.755	4.985	5.385	4.465	4.645	4.815	5.115
300-45	4.665	4.955	5.195	5.605	4.645	4.835	5.015	5.325
300-58	4.955	5.265	5.525	5.965	4.935	5.125	5.325	5.645
300-89	5.475	5.825	6.115	6.615	5.475	5.695	5.895	6.235
360-45	5.185	5.505	5.785	6.235	5.155	5.365	5.565	5.905
360-58	5.515	5.855	6.145	6.635	5.465	5.685	5.905	6.265
360-89	6.085	6.475	6.795	7.345	6.075	6.305	6.535	6.915
400-45	5.515	5.855	6.145	6.625	5.465	5.685	5.905	6.255
400-58	5.855	6.215	6.525	7.045	5.795	6.025	6.265	6.645
400-89	6.465	6.875	7.215	7.795	6.445	6.685	6.925	7.325

SPAN TABLE NOTES

1. Service Class 1 is suitable for intermediate floors in normal heated domestic dwellings. For other applications, please contact Metsä Wood Technical Support (01205 883 835) or your local distributor.
2. All loads are assumed to be uniformly distributed.
3. Load sharing and adequate lateral restraint to the flanges is taken into account in the design. Joist span tables assume that ceiling and decking is fixed in accordance with the appropriate British Standards.
4. Spans are clear spans i.e. between supports. Minimum end bearing length required is 45mm.
5. The applied live load is 1.5kN/m2 for single occupancy domestic dwellings.
6. Web stiffeners are not required for the spans listed above unless hangers do not laterally restrain the top flange.
7. The dead load condition for this table is based on the floor make-up shown on page 11.
8. Dead load condition is based on 22mm particle board decking and a 15mm plasterboard ceiling plus an allowance for non-load bearing partitions up to 0.66kN/m.
9. Performance classes as defined on page 10.
10. Span tables are calculated in accordance with BS EN 1995-1-1.
11. Consult Metsä Wood Technical Support for further information and conditions outside of the tables (01205 883 835) or your local distributor.

GENERAL NOTES:

a. Metsä Wood recommend that the decking is glued and fixed in accordance with British Standards. This can significantly improve the floor performance.
b. Deeper I-Joists will perform better than shallower I-Joists due to better deflection performance.
c. The depth of the floor decking influences performance with deeper floor decking improving stiffness.
d. Appropriate strutting of the joists may increase the floor stiffness. Consult Metsä Wood for advice (01205 883 835).
e. Correct bearing line and level is essential for in-service performance.
f. When using joist hangers ensure the correct joist hanger matched to joist type is used and that all nails are correctly specified and used.
g. Avoid using unspecified nails into the sides of the flange as this can lead to splitting.
h. On no account is the flange to be cut. For service holes refer to holes tables on page 26.
i. Other span tables are available on request.

KERTO-Q DESIGN VALUES*

TECHNICAL SPECIFICATIONS, STANDARDS AND DIMENSIONS

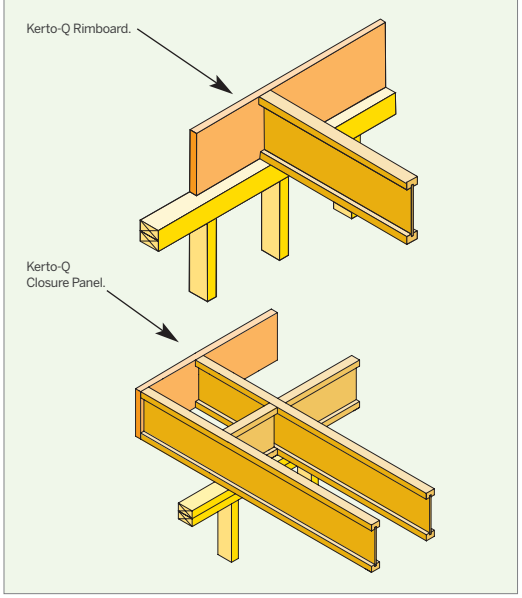
The structure of Kerto-Q improves the lateral bending strength and stiffness of the panel, and increases the shear strength when used as a beam. With cross bonded veneers (one fifth of the veneers are glued crosswise at 90°), there is also an essential reduction in dimensional variations in depth due to moisture.

Kerto-Q is the ideal choice for use as a rimboard with its strength, straightness and dimensional stability.

Kerto-Q is available in standard widths of 30 and 33mm with depths to suit Finnjoist depths.

Other widths up to 69mm of Kerto-Q are available as a special order.

KERTO-Q RIMBOARD



KERTO-Q DIMENSIONAL VARIATIONS

EXPRESSED IN % FOR A MOISTURE VARIATION OF 1% x MEASUREMENT (mm)	
Length	0.01%
Depth	0.03%
Thickness	0.24%

For further information see Kerto VTT certificate No 184-03 and BBA No 09/G010.

Example: A 240mm deep beam with a moisture change from 10% to 15% = a 5% change; 5 x 240mm x 0.03% = 0.36mm increase in depth.

KERTO-Q PERMISSIBLE GRADE STRESSES

BENDING AS A JOIST (F_b) N/mm²	TENSION PARALLEL TO GRAIN (F_t) N/mm²	COMPRESSION PERPENDICULAR TO GRAIN (F_c) N/mm²	SHEAR AS A JOIST (F_v) N/mm²	MODULUS OF ELASTICITY (E) N/mm²	MODULUS OF RIGIDITY (G) N/mm²
13.10	10.64	3.68	1.84	10500	600

* Allowable stress design values for use with BS5268.

KERTO-S DESIGN VALUES**

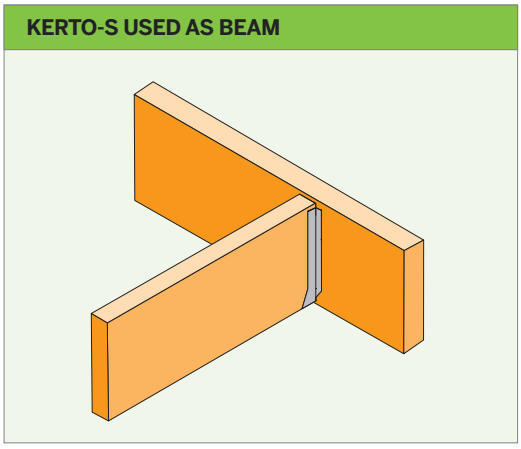
BEAMS & LINTELS DESIGN PROPERTIES

TECHNICAL SPECIFICATIONS, STANDARDS AND DIMENSIONS

Kerto-S unites excellent technical performance with ease of use. Strength, dimensional precision and stability are the essential qualities of Kerto-S. As a beam it is the perfect choice whenever the requirements include long spans and minimal deflection.

Kerto-S is also ideal for use as elements in roofs, floors and walls such as purlins, beams, joists and lintels.

KERTO-S USED AS BEAM



KERTO-S SECTIONAL PROPERTIES

DEPTH	BEAM WIDTH	AREA	SECTION MODULUS ABOUT X-X	SECOND MOMENT ABOUT X-X	MOMENT CAPACITY	SHEAR CAPACITY	WEIGHT
mm	mm	10^2mm^2	10^3mm^3	10^4mm^4	kNm	kN	kg/m
200	39	78	260	2600	4.68	13.26	3.98
	45	90	300	3000	5.40	15.30	4.59
	75	150	500	5000	9.00	25.50	7.65
	90	180	600	6000	10.80	30.60	9.18
220	39	86	315	3461	5.66	14.59	4.38
	45	99	363	3993	6.53	16.83	5.05
	75	165	605	6655	10.89	28.05	8.42
	90	198	726	7986	13.07	33.66	10.10
240	39	94	374	4493	6.74	15.91	4.77
	45	108	432	5184	7.78	18.36	5.51
	75	180	720	8640	12.96	30.60	9.18
	90	216	864	10368	15.55	36.72	11.02
300	39	117	585	8775	10.53	19.89	5.97
	45	135	675	10125	12.15	22.95	6.89
	75	225	1125	16875	20.25	38.25	11.48
	90	270	1350	20250	24.30	45.90	13.77
360	45*	162	972	17496	17.50	27.54	8.26
	75	270	1620	29160	29.16	45.90	13.77
	90	324	1944	34992	34.99	55.08	16.52
400	45*	180	1200	24000	21.60	30.60	9.18
	75	300	2000	40000	36.00	51.00	15.30
	90	360	2400	48000	43.20	61.20	18.36

* Use only as two or more ply beams.

KERTO-S PERMISSIBLE GRADE STRESSES

BENDING AS A JOIST (F_b) N/mm²	TENSION PARALLEL TO GRAIN (F_t) N/mm²	COMPRESSION PERPENDICULAR TO GRAIN (F_c) N/mm²	SHEAR AS A JOIST (F_v) N/mm²	MODULUS OF ELASTICITY (E) N/mm²	MODULUS OF RIGIDITY (G) N/mm²
18.00	14.33	2.46	1.68	13800	600

Permissible stresses are applicable to long term load duration.
For further design information see Kerto® VTT Certificate No. 184-03 and BBA No. 09/G010.

KERTO-S MINIMUM BEARINGS

BEAM WIDTH	MINIMUM - BEARING LENGTHS (mm)							
	REACTION (kN)							
(mm)	5	10	15	20	25	30	35	40
39	40	80	120	160	200	240	280	321
45	38	69	104	139	174	208	243	278
75	38	42	63	83	104	125	146	167
90	38	38	52	69	87	104	122	139

NOTES:

1. Minimum allowable bearing length is 38mm for end bearings. For Masonry Construction see detail M1.
2. Table values are based on a support with an allowable bearing stress of 3.2 N/mm². If a lower strength support is used, appropriate bearing lengths must be calculated.
3. Lateral restraint must be provided at end bearings.

KERTO-S PERMISSIBLE UNIFORM LOADS kN/m

SPAN (m)	DEPTH (mm) 200				DEPTH (mm) 220				DEPTH (mm) 240				DEPTH (mm) 300				DEPTH (mm) 350			DEPTH (mm) 400		
	WIDTH (mm)				WIDTH (mm)				WIDTH (mm)				WIDTH (mm)				WIDTH (mm)			WIDTH (mm)		
	39	45	75	90	39	45	75	90	39	45	75	90	39	45	75	90	45	75	90	45	75	90
2	8.41	9.70	16.17	19.41	10.13	11.69	19.48	23.37	11.34	13.08	21.81	26.17	15.39	17.76	29.59	35.51	38.84	46.61	61.60	27.62	46.04	55.24
2.5	4.62	5.33	8.88	10.65	5.98	6.90	11.51	13.81	7.55	8.71	14.52	17.43	15.39	13.08	21.81	26.17	27.93	33.52	46.20	19.50	32.50	38.99
3	2.78	3.21	5.35	6.42	3.63	4.19	6.98	8.38	4.62	5.33	8.88	10.65	11.34	9.70	16.17	19.41	21.81	26.17	36.96	15.07	25.11	30.13
3.5	1.80	2.07	3.45	4.14	2.35	2.72	4.53	5.43	3.01	3.47	5.79	6.95	5.57	6.43	10.72	12.86	17.41	20.89	25.61	12.28	20.46	24.55
4	1.22	1.41	2.35	2.82	1.61	1.85	3.09	3.71	2.06	2.38	3.96	4.76	3.86	4.45	7.42	8.91	12.21	14.65	17.70	9.69	16.16	19.39
4.5	0.87	0.89	1.48	2.00	1.15	1.17	1.96	2.35	1.31	1.51	2.52	3.02	2.47	2.85	4.75	5.70	7.88	9.46	12.64	6.30	10.50	12.60
5	0.64	0.59	0.98	1.47	0.84	0.78	1.30	1.56	0.87	1.00	1.67	2.00	2.47	1.90	3.17	3.81	5.30	6.36	9.29	4.26	7.10	8.51
5.5	0.48	0.40	0.67	1.11	0.64	0.54	0.89	1.07	0.60	0.69	1.15	1.38	1.65	1.32	2.20	2.63	3.69	4.43	7.51	2.97	4.96	5.95
6	0.37	0.29	0.48	0.86	0.49	0.38	0.63	0.76	0.43	0.49	0.82	0.98	0.81	0.94	1.57	1.88	2.64	3.17	6.47	2.14	3.56	4.27
6.5	0.29	0.21	0.35	0.68	0.39	0.28	0.46	0.55	0.31	0.36	0.60	0.72	0.60	0.69	1.57	1.38	1.94	2.33	5.60	1.57	2.62	3.15

NOTES:

1. Beam span is defined as design span (between support points).
2. The tabulated values are loads (kN/m) that can be applied to the beam in addition to the self weight of the beam.
3. Proper bearing must be provided. Bearing length must be checked for support reaction with the minimum bearing table above.
4. To prevent buckling, lateral restraint is required on the compression edge of Kerto-S beams at 600mm centres or closer. This restraint is normally provided by decking and or framing members. Beams that are not laterally supported at 600mm centres or less require special design.

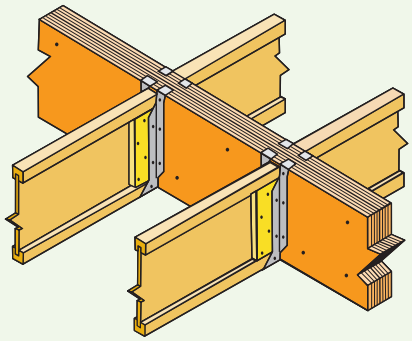
KERTO-S MULTIPLE PLY BEAMS

SIDE LOADED

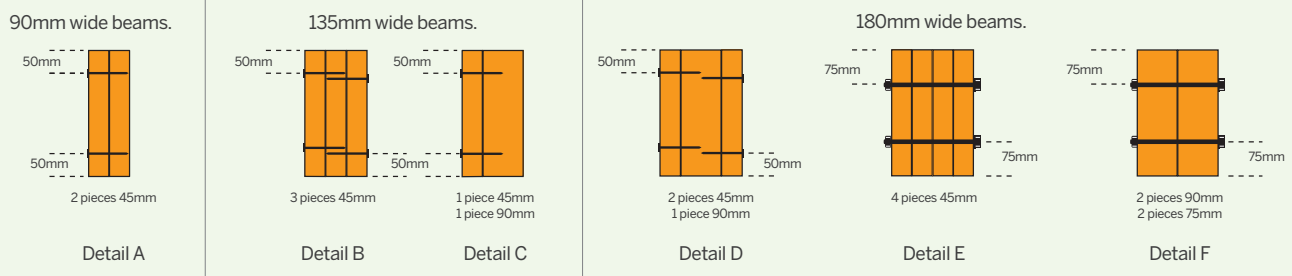
Joists applied to one or both sides of the beam. Select a suitable nailing or bolting pattern from the table on page 17 to suit the applied load.

Side loads are not recommended for 180mm wide beams unless applied equally to both beam faces.

SIDE LOADED



SIDE LOADED



Side Loads are not recommended for 180mm beams (or 4 Ply - 39mm) unless equally applied to both faces.

MAXIMUM TOTAL UNIFORM LOAD FROM EITHER SIDE FOR SIDE LOADED BEAMS (kN/m)

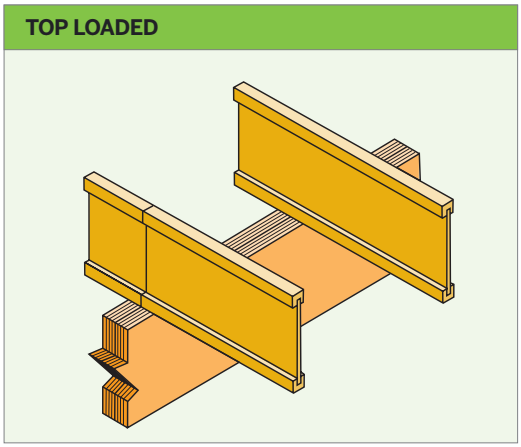
DETAIL REF.	3.35 x 90mm NAILS 2 R	3 R	4 R	3.75 x 90mm NAILS 2 R	3 R	4 R	4.0 x 90mm NAILS 2 R	3 R	4 R	M12-4.6 GRADE BOLTS IN 2 R 600mm c/c	300mm c/c
	NAILS AT 300mm c/c			NAILS AT 300mm c/c			NAILS AT 300mm c/c				
A	3.88	5.82	7.76	4.67	7.01	9.34	5.19	7.79	10.38	8.70	17.40
B	5.82	8.73	11.64	7.01	10.51	14.01	7.79	11.68	15.57	13.48	26.96
C	5.82	8.73	11.64	7.01	10.51	14.01	7.79	11.68	15.57	9.79	19.58
D	7.76	11.64	15.52	9.34	14.01	18.68	10.38	15.57	20.76	17.92	35.84
E	-	-	-	-	-	-	-	-	-	13.48	26.96
F	-	-	-	-	-	-	-	-	-	16.74	33.48

1. All values are for medium term loading.
2. Use spacing patterns as shown on P.17.
3. 39mm Kerto-S may be used in place of 45mm for details A,B and E. When using multiple ply 39mm Kerto-S, 75mm long nails may be used in place of 90mm long nails.
4. Other details available from Metsä Wood Technical Support 01205 883 835.

TOP LOADED

For a downstand beam with joists above, fix plys using 3.35 x 90mm nails at 300mm c/c. For discontinuous joists, if loads are not applied equally on each ply, please refer to the table on side loaded beams.

TOP LOADED

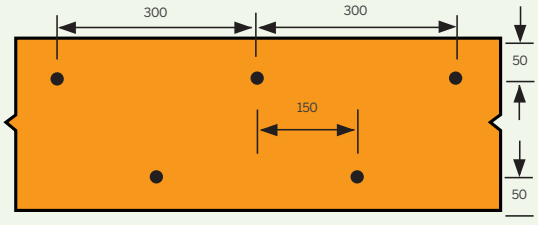


TOP LOADED BEAM

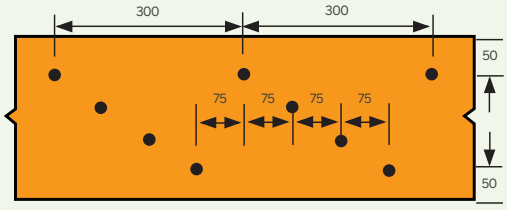
ROWS OF NAILS AT 300 c/c	DEPTH
2	<300
3	300 - 450
4	450 - 600

NAIL AND BOLT SPACING FOR TOP AND SIDE LOADED BEAMS

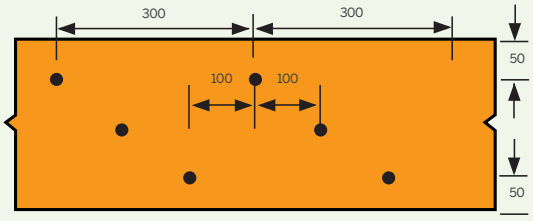
KERTO® NAIL AND BOLT SPACING



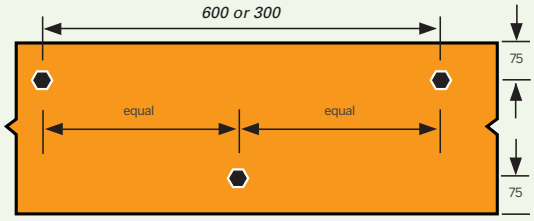
2 Rows of Nails.



4 Rows of Nails.



3 Rows of Nails.



2 Rows of Bolts spaced at 600mm or 300mm centres, provide 36mm diameter x 3mm thick washers under bolt head and nut. Bolts must not be countersunk.

All measurements in mm.

CHARACTERISTIC VALUES

KERTO FOR USE WITH EUROCODE 5 ONLY

PROPERTY	SYMBOL	KERTO-S	KERTO-Q (27-69)		USED FOR
5TH PERCENTILE VALUES					
Bending Strength					
Edgewise	$f_{m,0,edge,k}$	44.0	32.0	N/mm²	
Size effective parameter	s	0.12	0.12		
Flatwise	$f_{m,0,flat,k}$	50.0	36.0	N/mm²	
Tension Strength					
Parallel to the grain	$f_{t,0,k}$	35.0	26.0	N/mm²	
Perpendicular to the grain edgewise	$f_{t,90,edge,k}$	0.8	6.0	N/mm²	
Compression Strength					
Parallel to the grain	$f_{c,0,k}$	35.0	26.0	N/mm²	
Perpendicular to the grain edgewise	$f_{c,90,edge,k}$	6.0	9.0	N/mm²	
Perpendicular to the grain flatwise	$f_{c,90,flat,k}$	1.8	2.2	N/mm²	
Shear Strength					
Edgewise	$f_{v,0,edge,k}$	4.1	4.5	N/mm²	
Flatwise	$f_{v,0,flat,k}$	2.3	1.3	N/mm²	
Modulus of Elasticity					
Parallel to the grain	$E_{0,k}$	11600	8800	N/mm²	Stability design only
Shear Modulus					
Edgewise	$G_{0,k}$	400	400	N/mm²	Stability design only
Density	ρ_k	480	480	kg/m³	Connection design only
MEAN VALUES					
Modulus of Elasticity					
Parallel to the grain	$E_{0,mean}$	13800	10500	N/mm²	Deflection design
Shear Modulus					
Edgewise	$G_{0,mean}$	600	600	N/mm²	Deflection design
Density	ρ_{mean}	510	510	kg/m³	Weight & loading

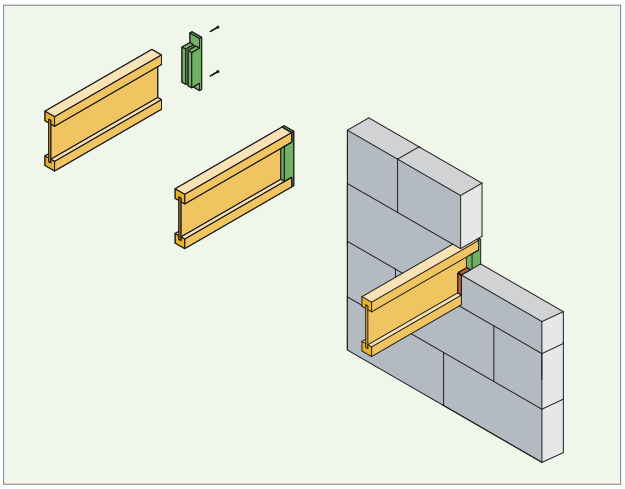
FINNJOIST FOR USE WITH EUROCODE 5 ONLY

JOIST TYPE	WEIGHT	MOMENT CAPACITY	FLEXURAL RIGIDITY	SHEAR CAPACITY	SHEAR RIGIDITY	END BEARING 45mm		INTERMEDIATE BEARING 89mm	
						NS	S	NS	S
	kg/m	kN/m	x 10^{12} Nmm²	kN	x 10^{6} N	kN	kN	kN	kN
200-45	2.64	7.67	0.312	9.01	1.59	8.93	10.56	17.73	19.35
200-58	3.16	10.08	0.404	9.59	1.59	10.91	12.54	21.66	23.28
200-89	4.42	15.65	0.625	9.91	1.59	12.98	14.61	25.76	27.39
220-38	2.48	7.15	0.330	10.10	1.81	7.86	9.49	15.61	17.23
220-45	2.76	8.61	0.393	10.47	1.81	8.93	10.56	17.73	19.35
220-58	3.29	11.31	0.509	11.15	1.81	10.91	12.54	21.66	23.28
220-89	4.55	17.55	0.787	11.52	1.81	12.98	14.61	25.76	27.39
240-38	2.61	7.95	0.407	11.30	2.03	7.86	9.49	15.61	17.23
240-45	2.89	9.57	0.484	11.70	2.03	8.93	10.56	17.73	19.35
240-58	3.42	12.56	0.627	12.47	2.03	10.91	12.54	21.66	23.28
240-89	4.68	19.47	0.969	12.88	2.03	12.98	14.61	25.76	27.39
300-38	2.99	10.40	0.690	13.63	2.67	7.86	9.49	15.61	17.23
300-45	3.28	12.50	0.820	14.13	2.67	8.93	10.56	17.73	19.35
300-58	3.80	16.36	1.060	15.05	2.67	10.91	12.54	21.66	23.28
300-89	5.06	25.29	1.632	15.54	2.67	12.98	14.61	25.76	27.39
360-45	3.66	15.51	1.249	15.94	3.32	8.93	10.56	17.73	19.35
360-58	4.19	20.25	1.611	16.97	3.32	10.91	12.54	21.66	23.28
360-89	5.45	31.20	2.475	17.53	3.32	12.98	14.61	25.76	27.39
400-45	3.92	17.56	1.589	18.19	3.32	8.93	10.56	17.73	19.35
400-58	4.44	22.89	2.047	19.37	3.32	10.91	12.54	21.66	23.28
400-89	5.70	35.19	3.139	20.01	3.32	12.98	14.61	25.76	27.39

Please refer to page 9 for notes.

FINNSEAL

Metsä Wood Finnseal has been developed to offer a simple, fast and engineered solution to achieving compliance with the requirements of the Building Regulations.



- *Metsä Wood Finnseal is a machined timber product, designed to be fitted to the end of the Finnjoist to provide a fast, simple and efficient solution to the requirements of the Building Regulations.*
- *Metsä Wood Finnseal is machined to provide a secure fit when nailed to the end of the Finnjoist.*
- *Metsä Wood Finnseal provides a shield to the Finnjoist in the event of elevated moisture levels in the cavity.*
- *Metsä Wood Finnseal removes the need for sealing around the perimeter of the I-Joist with mastic.*

Metsä Wood Finnseal is accepted for use in external walls by both the NHBC and Zurich. The Metsä Wood Finnseal has been assessed to provide compliance to parts A, B, E & L of the Building Regulations (Structure, Fire, Sound and Air Leakage).

AIR LEAKAGE

Metsä Wood Finnseal has been tested for air leakage by CERAM (Report SW045/05) in depths of 220, 240, 300, 360 and 400mm and widths of 38, 45, 58 and 89mm. This detail has been shown to be almost twice as effective as some currently accepted methods of demonstrating compliance to the requirements of Part L.

FIRE

Metsä Wood Finnseal has been assessed by Chiltern Fire (report FEE/F05012) as providing an adequate fire stop for use in both external and party walls.

SOUND

When using Metsä Wood Finnseal in a party wall situation, it is necessary to refer to the information provided by Robust Details Ltd. Metsä Wood Finnseal can comply with the details provided in the section 'Separating Wall-Cavity Masonry' details E-WM - 1 to 6. Please also refer to appendix A regarding proprietary joist caps/ends.

WORKING PLATFORM

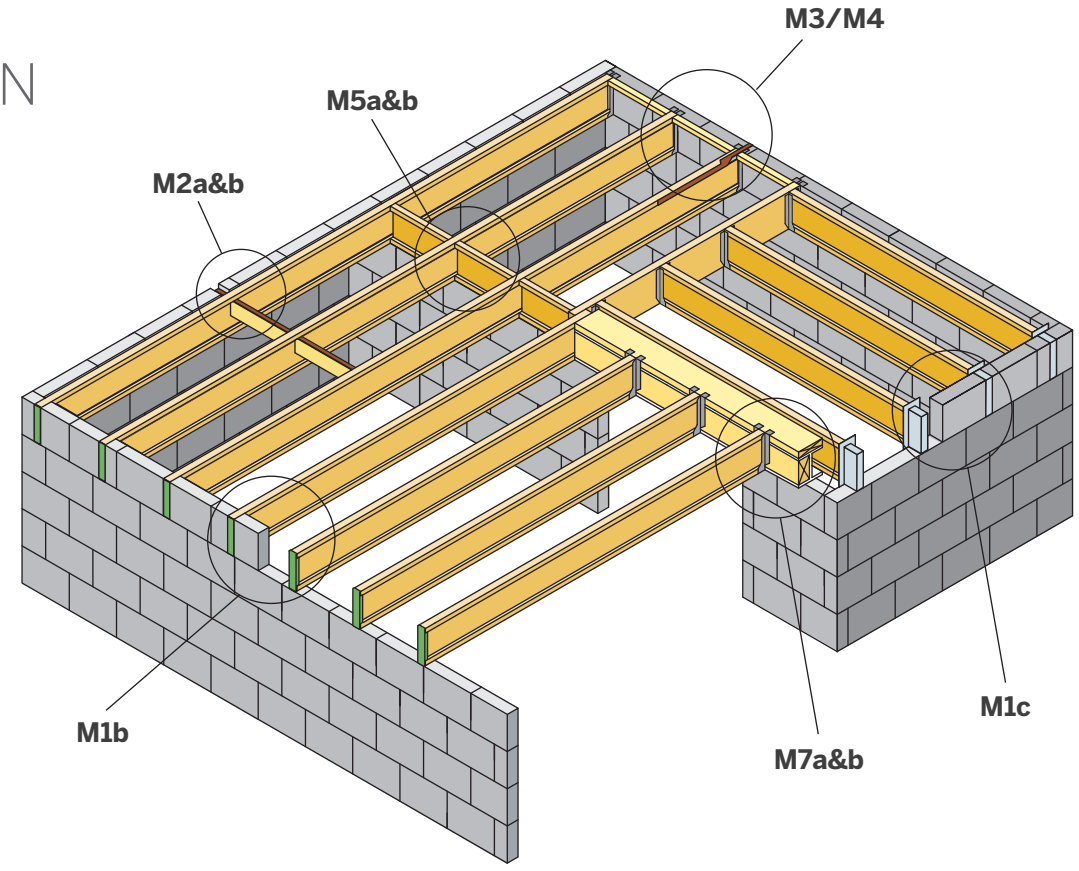
Provided the Metsä Wood safe loading chart is followed, there is no need for additional propping to the floor during construction. Should Finnseals be used in conjunction with Masonry Hangers, it will be necessary to contact Metsä Wood or the hanger manufacturer for further information.

MASONRY CONSTRUCTION

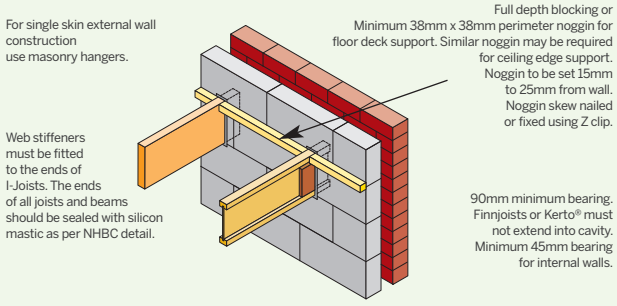
The following details are representations of the type of detailing for Finnframe floor construction when used within masonry walled buildings.

The building designer is responsible for ensuring that details are appropriate for the end application.

Please ensure all solid timber used with Finnjoist is dried to the suitable Service Class level.

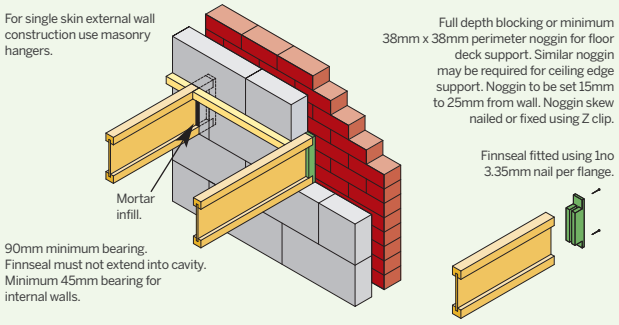


M1a CAVITY WALL
(Joists built in)



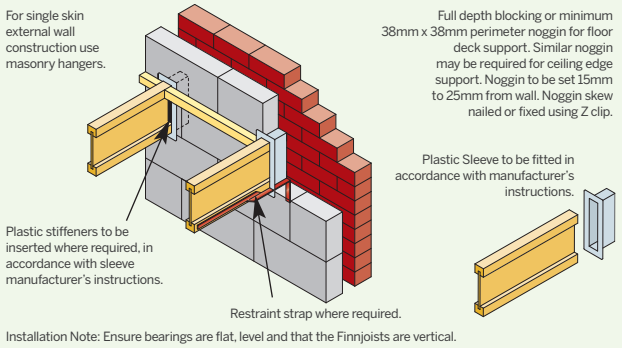
Installation note: Ensure bearings are flat, level and that the Finnjoists or Kerto® are vertical.

M1b CAVITY WALL
(Finnseal)



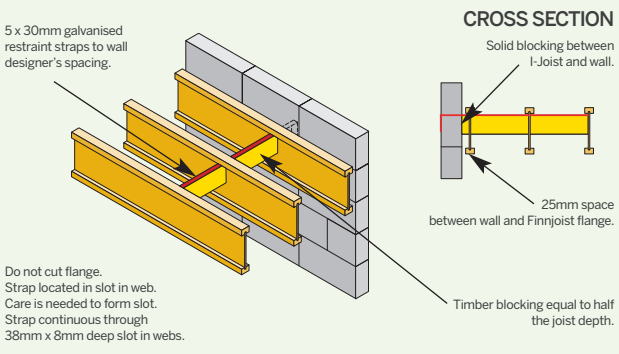
Installation Note: Ensure bearings are flat, level and that the Finnjoists are vertical.

M1c CAVITY WALL
(Plastic sleeve)

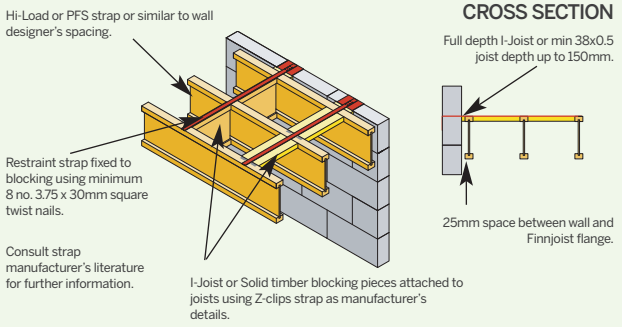


Installation Note: Ensure bearings are flat, level and that the Finnjoists are vertical.

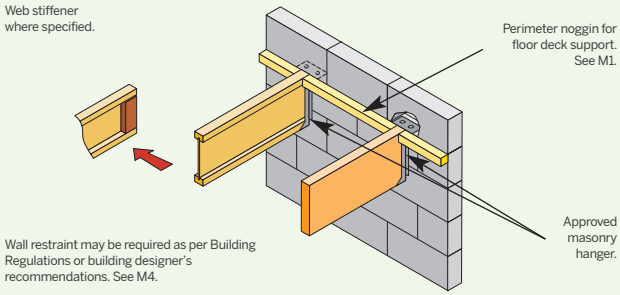
M2a RESTRAINT STRAP
(I-Joist parallel to wall)



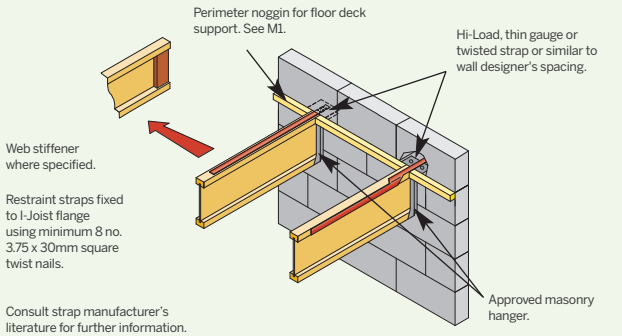
M2b RESTRAINT STRAP
(I-Joist parallel to wall)



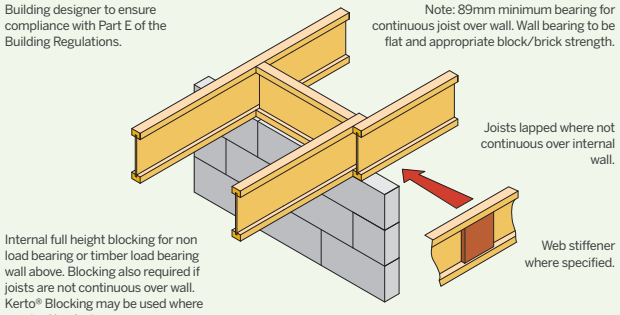
M3 MASONRY HANGER
(alternative details may apply, contact hanger manufacturer for information)



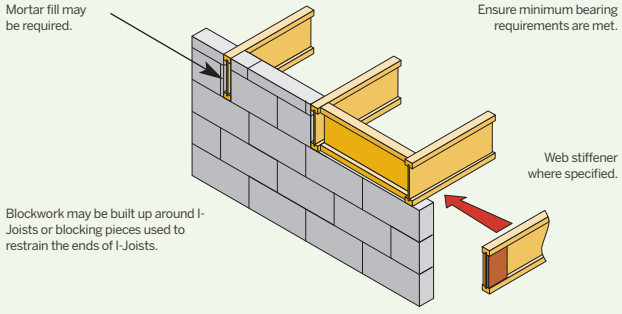
M4 RESTRAINT STRAP
(I-Joist perpendicular to wall)



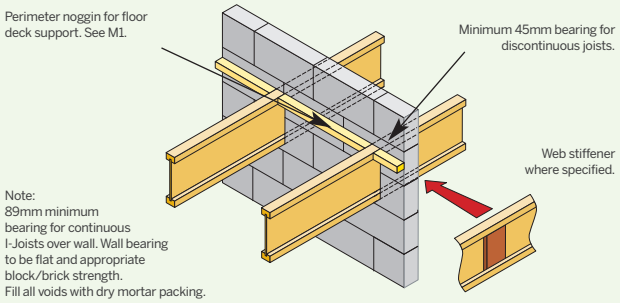
M5a INTERNAL WALL
(no masonry wall above)



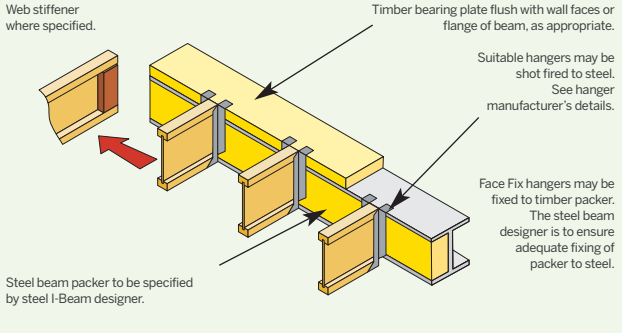
M5b INTERNAL WALL
(I-Joists ending on wall, no masonry wall above)



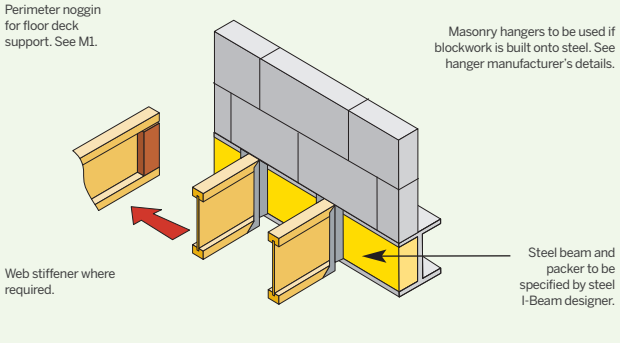
M6 INTERNAL WALL
(masonry wall above)



M7a STEEL BEAM
(I-Joist hanger/blocking to suit design)



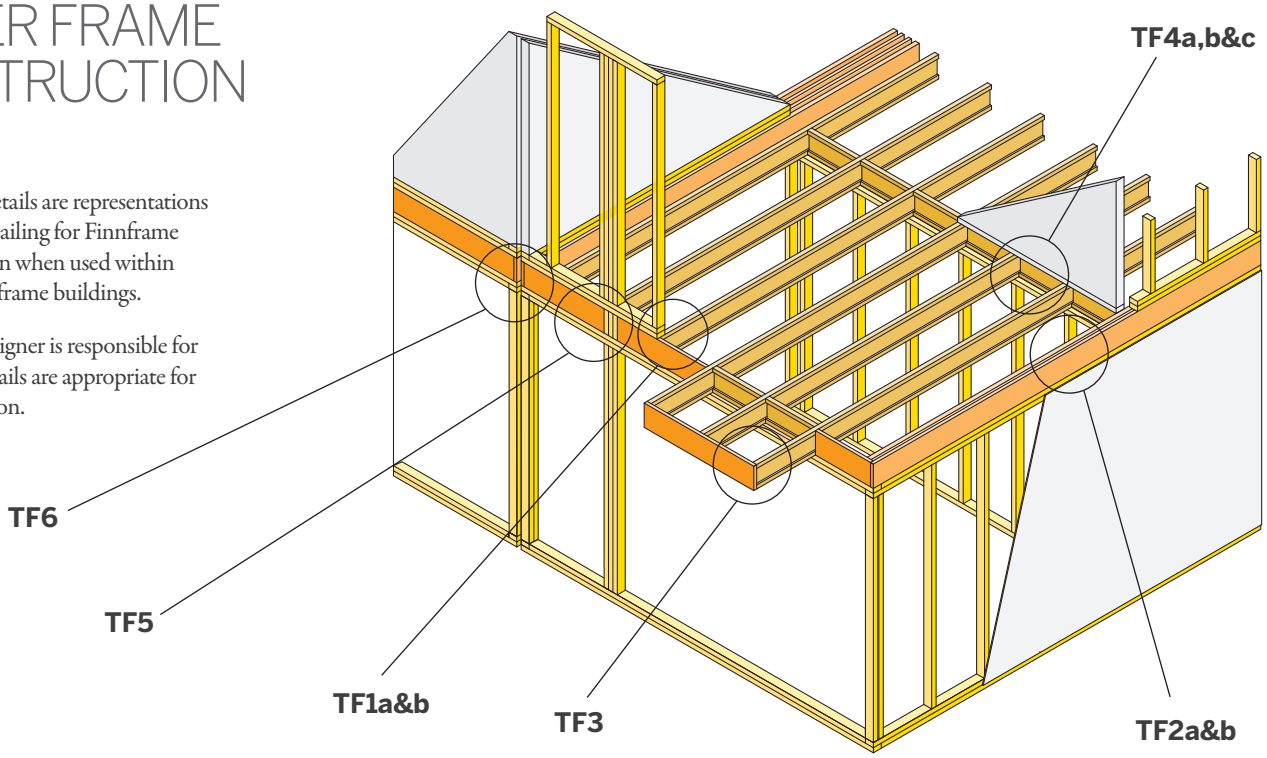
M7b STEEL BEAM
(masonry above)



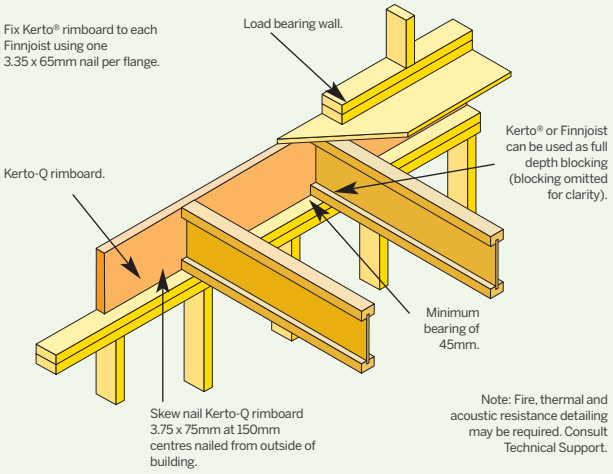
TIMBER FRAME CONSTRUCTION

The following details are representations of the type of detailing for Finnframe floor construction when used within platform timber frame buildings.

The building designer is responsible for ensuring that details are appropriate for the end application.

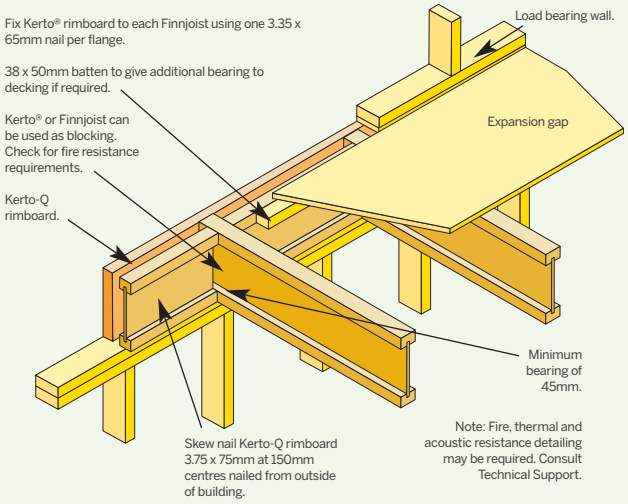


TF1a KERTO-Q RIMBEAM PERPENDICULAR TO JOISTS



Note: Fire, thermal and acoustic resistance detailing may be required. Consult Technical Support.

TF1b KERTO-Q RIMBEAM PERPENDICULAR TO JOISTS

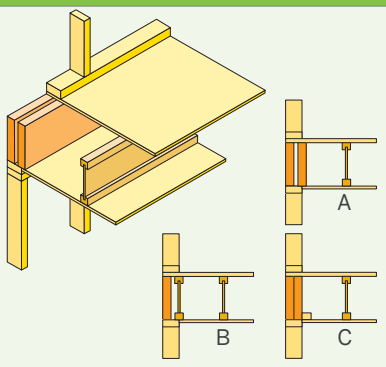


Note: Fire, thermal and acoustic resistance detailing may be required. Consult Technical Support.

TF2a KERTO-Q RIMBEAM PARALLEL TO JOISTS

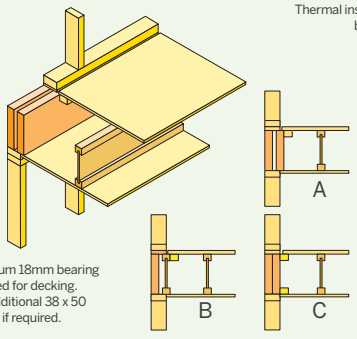
Ensure header joist rimboard is tied to floor zone by decking to building designer's details. Where decking expansion gap is required alternative support is required (see TF2b).

Thermal insulation and fire requirements to building designer's specification. Where 27mm rimboard is used with details A or C, additional stability blocks required at 600mm centres.



TF2b KERTO-Q RIMBEAM PARALLEL TO JOISTS

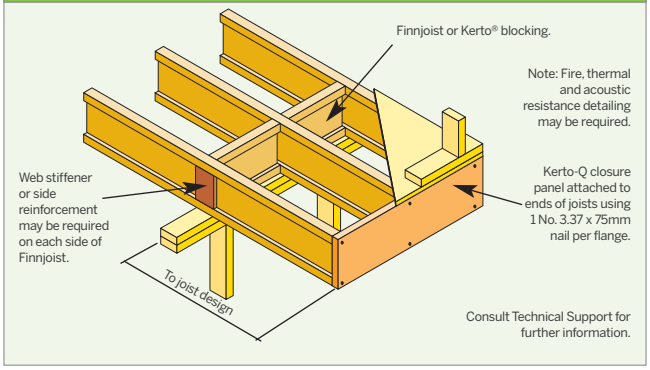
Thermal insulation and fire requirements to building designer's specification.



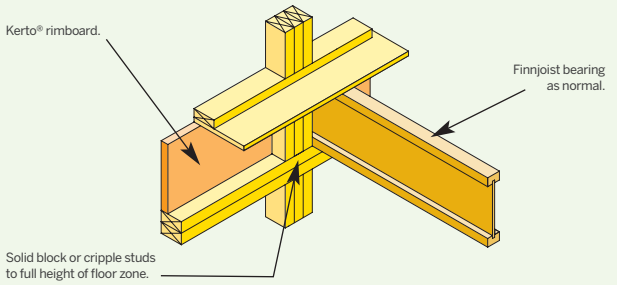
Minimum 18mm bearing required for decking. Use additional 38 x 50 batten if required.

Where 27mm rimboard is used with details A or C additional stability blocks required at 600mm centres.

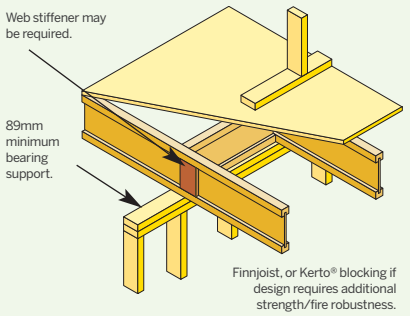
TF3 CANTILEVERED JOIST CONDITION



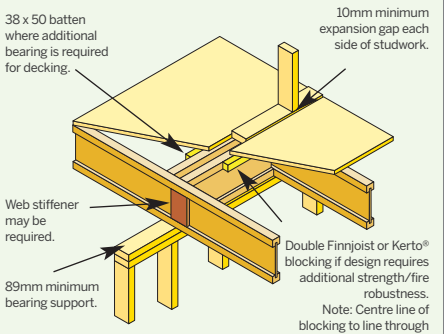
TF5 COMPRESSION BLOCK
(for high loads contact Technical Support)



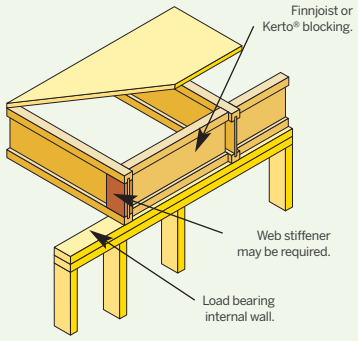
T4a TIMBER LOAD BEARING INTERNAL WALL ABOVE



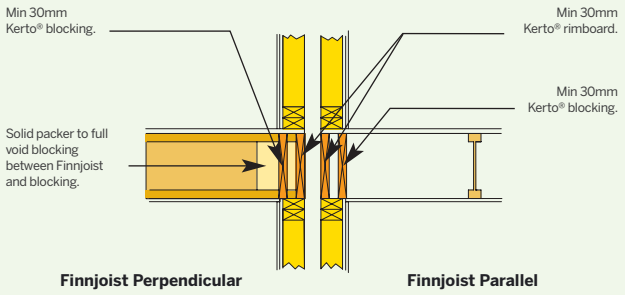
T4b TIMBER LOAD BEARING INTERNAL WALL ABOVE



T4c JOISTS ENDING ON INTERNAL WALL

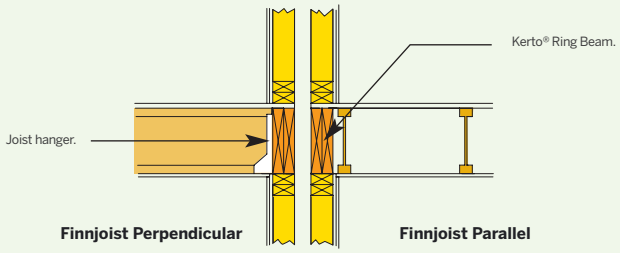


TF6 PARTY WALLS



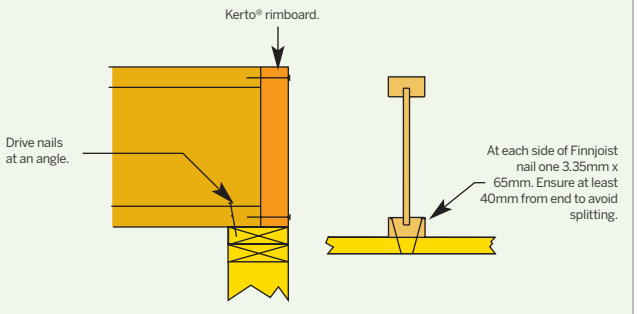
Insulation/timber frame detailing omitted for clarity (plasterboard to regulation requirements).

TF7 DISPROPORTIONATE COLLAPSE

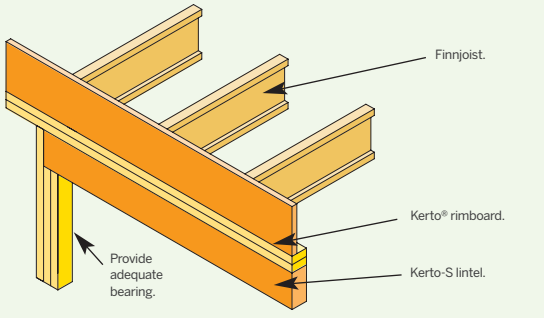


Alternative party wall option (typical disproportionate collapse detail).

TF8 TYPICAL FINNJOIST TO SUPPORT NAILING



TF9 WINDOW/DOOR LINTEL DETAIL

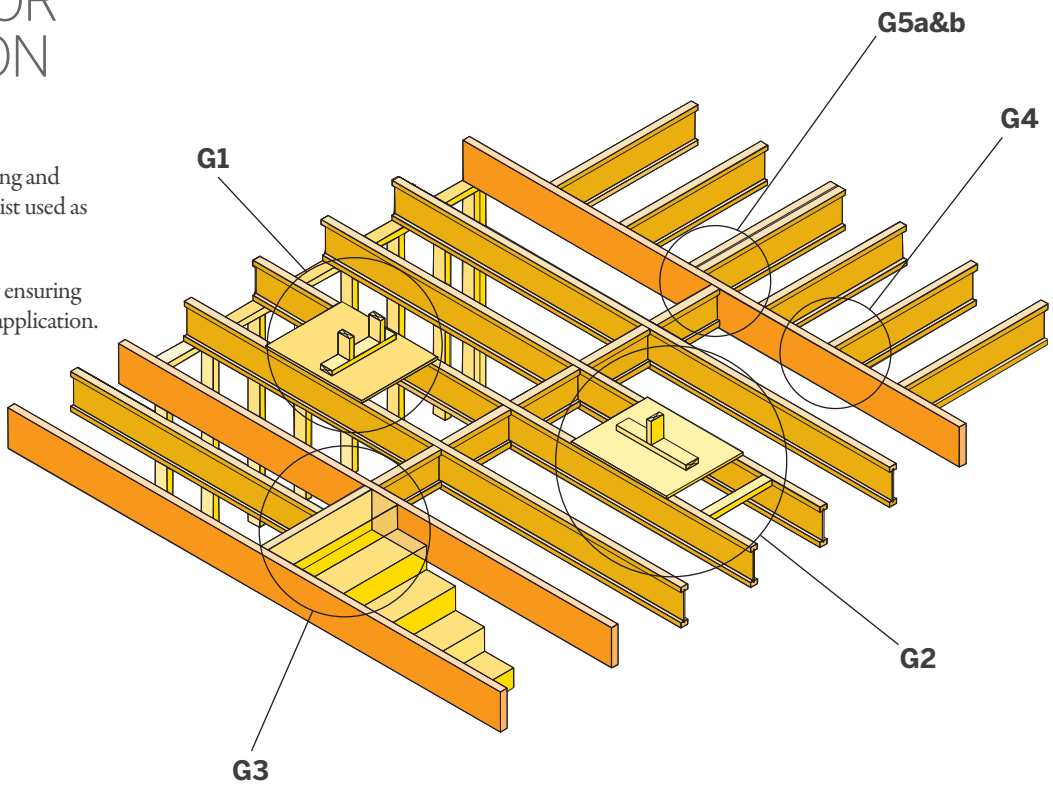


GENERAL FLOOR CONSTRUCTION

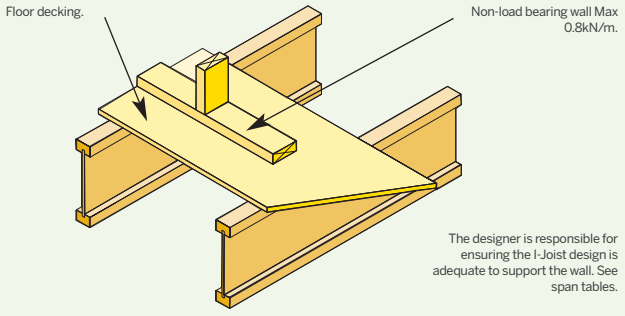
The following details are general detailing and construction representations for Finnjoist used as the structural members in floors.

The building designer is responsible for ensuring that details are appropriate for the end application.

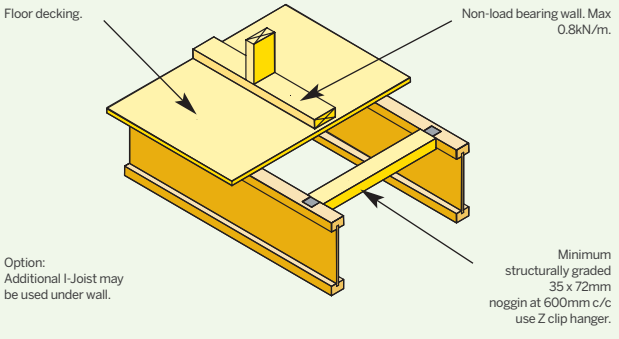
Please ensure all solid timber used with Finnjoist is dried to the suitable Service Class level.



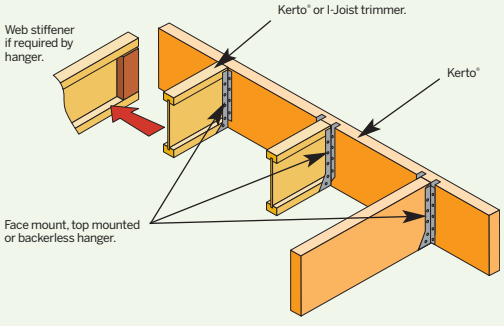
G1 NON-LOAD BEARING PARTITION WALL PERPENDICULAR AND SUPPORTED BY I-JOISTS



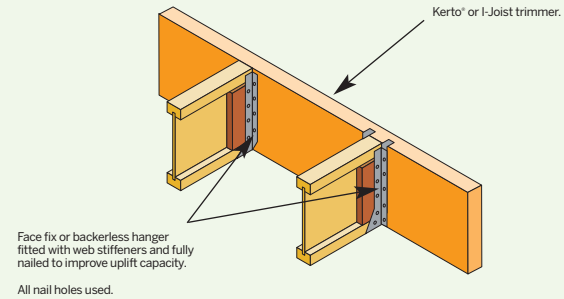
G2 NON-LOAD BEARING PARTITION WALL PARALLEL - SUPPORTED BY I-JOISTS



G3 CONNECTION DETAILS

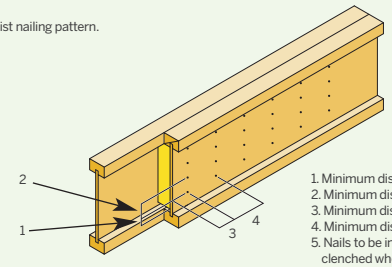


G4 ADDITIONAL CAPACITY NAILING (required due to uplift)



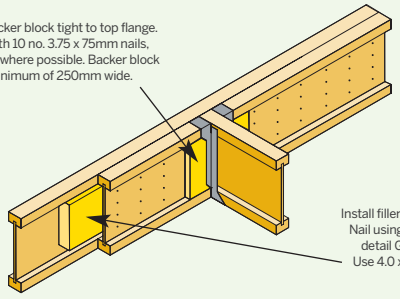
G5a FINNJOIST TO FINNJOIST (double I-Joists)

2 ply Finnjoist nailing pattern.



1. Minimum distance to top and bottom edge 20mm.
2. Minimum distance vertically between nails 35mm.
3. Minimum distance between side and nail 65mm.
4. Minimum distance horizontally between nails 65mm.
5. Nails to be installed from hanger face of 2ply joist and clenched where possible.

Install Backer block tight to top flange. Attach with 10 no. 3.75 x 75mm nails, clenched where possible. Backer block to be a minimum of 250mm wide.



Install filler block tight to top flange. Nail using 4.0 x 75mm nails as per detail G5b and Filler block table. Use 4.0 x 100mm nails for 89mm wide flanges.

BACKER BLOCK AND WEB STIFFENER TABLE

	I-JOIST SERIES			
DEPTH	FJI 38	FJI 45	FJI 58	FJI 89
200	-	18 x 115	22 x 115	38 x 115
220	12 x 135	18 x 135	22 x 135	38 x 135
240	12 x 155	18 x 155	22 x 155	38 x 155
300	12 x 215	18 x 215	22 x 215	38 x 215
360	12 x 275	18 x 275	22 x 275	38 x 275
400	12 x 315	18 x 315	22 x 315	38 x 315

- All Backer blocks to be minimum 250mm wide.
- All web stiffeners to be minimum 100mm wide.
- Use solid timber, structural ply or OSB3 to BS5268.

FILLER BLOCK TABLE

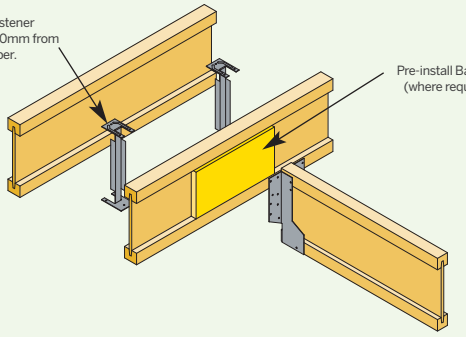
	FINNJOIST WIDTH				FILLER BLOCK	
DEPTH	FJI 38	FJI 45	FJI 58	FJI 89	LENGTH	NO. OF NAILS
200	-	38 x 115	47 x 115	79 x 115	600	12
220	12 x 135	38 x 135	47 x 135	79 x 135	600	12
240	12 x 155	38 x 155	47 x 155	79 x 155	600	16
300	12 x 215	38 x 215	47 x 215	79 x 215	600	16
360	12 x 275	38 x 275	47 x 275	79 x 275	600	16
400	12 x 315	38 x 315	47 x 315	79 x 315	600	20

- Filler block to be positioned centrally at hanger and at end of joist.
- At the ends of 2 ply joists use 600mm wide filler blocks with 6 no. nails.
- For 89mm flanged I-Joists nails must be applied from both faces.

G5b 2 PLY METAL FASTENER

2 ply metal fastener fitted max 200mm from carried member.

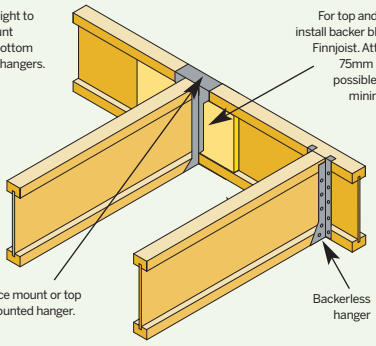
Pre-install Backer blocks (where required) as per detail G6a.



G6a FINNJOIST TO FINNJOIST JUNCTION

Install Backer blocks tight to top flange for top mount hangers and tight to bottom flange for face mount hangers.

For top and face mount hangers, install backer blocks on both sides of Finnjoist. Attach with 10 no. 3.75 x 75mm nails, clenched where possible. Backer block to be a minimum of 250mm wide.

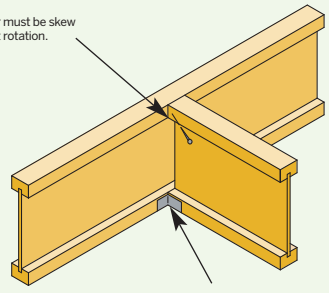


Face mount or top mounted hanger.

Backerless hanger

G6b MINI HANGER CONNECTION

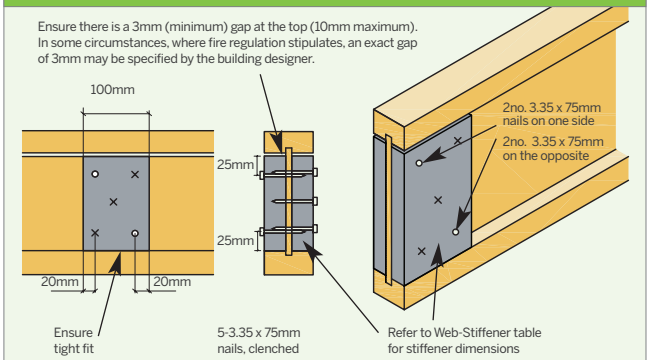
Carried member must be skew nailed to prevent rotation.



Mini hanger installed in accordance with manufacturer's instructions.

G7 WEB STIFFENER CONNECTION

Ensure there is a 3mm (minimum) gap at the top (10mm maximum). In some circumstances, where fire regulation stipulates, an exact gap of 3mm may be specified by the building designer.



Ensure tight fit

5-3.35 x 75mm nails, clenched

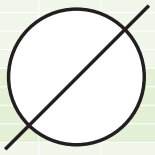
Refer to Web-Stiffener table for stiffener dimensions

HOLE CONSTRUCTION

FINNJOIST (FJI) ROUND HOLE CHART

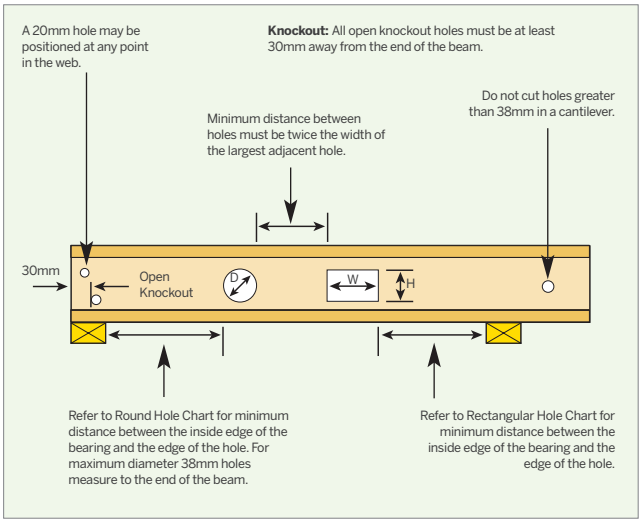
Distance from edge of hole to inside edge of supports in mm.

JOIST TYPE	HOLE DIA	SPAN (m)																		
		2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00
200	38	30	30	92	248	405	561	717	873	1030	1186									
	50	300	300	300	310	466	622	778	935	1091	1247									
	75	300	375	531	688	844	1000	1156	1313	1469	1625									
	100	633	789	945	1101	1258	1414	1570	1726	1883	2039									
220	38	30	30	30	30	30	183	339	495	652	808	964	1120							
	50	300	300	300	300	300	300	339	495	652	808	964	1120							
	75	300	300	300	300	425	581	738	894	1050	1206	1363	1519							
	100	300	375	531	688	844	1000	1156	1313	1469	1625	1781	1938							
240	38	30	30	30	30	30	30	84	240	396	552	709	865	1021						
	50	300	300	300	300	300	300	300	327	483	639	795	952	1108						
	75	300	300	300	300	300	300	446	603	759	915	1071	1228	1384						
	100	300	300	300	386	543	699	855	1011	1168	1324	1480	1636	1793						
	125	326	482	639	795	951	1107	1264	1420	1576	1732	1889	2045	2201						
300	38	30	30	30	30	30	30	30	30	151	307	463	620	776	932	1088				
	50	300	300	300	300	300	300	300	300	325	481	637	793	950	1106	1262				
	75	300	300	300	300	300	300	300	347	503	660	816	972	1128	1285	1441				
	100	300	300	300	300	300	300	370	526	682	838	995	1151	1307	1463	1620				
	125	300	300	300	300	300	397	554	710	866	1022	1179	1335	1491	1647	1804				
360	38	30	30	30	30	30	30	30	30	30	30	30	170	326	483	639	795	951		
	50	300	300	300	300	300	300	300	300	300	300	300	329	485	641	797	954	1110		
	75	300	300	300	300	300	300	300	300	300	348	504	661	817	973	1129	1286	1442		
	100	300	300	300	300	300	300	300	368	524	680	836	993	1149	1305	1461	1618	1774		
	125	300	300	300	300	300	300	375	531	687	844	1000	1156	1312	1469	1625	1781	1937		
400	38	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	131	287	444	600
	50	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	446	602	758
	75	300	300	300	300	300	300	300	300	300	300	300	300	300	309	465	621	778	934	1090
	100	300	300	300	300	300	300	300	300	300	300	300	329	485	641	797	954	1110	1266	1422
	125	300	300	300	300	300	300	300	300	300	348	504	661	817	973	1129	1286	1442	1598	1754



Coloured areas indicate minimum distance to support edge for holes greater than 38mm. For notes see below. *Biggest value height or width.

FINNJOIST (FJI) WEB



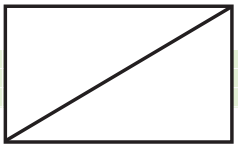
NOTES FOR FINNJOIST HOLE CONSTRUCTION:

1. **DO NOT CUT OR NOTCH FLANGES**
2. Cut holes carefully. DO NOT over-cut. DO NOT cut flanges. ROUND CORNERS OF RECTANGULAR HOLES WHEN POSSIBLE.
3. Holes must not be closer than 8mm from I-Joist flange.
4. For rectangular holes, avoid over-cutting the corners. Slightly rounding the corners is recommended. Starting the rectangular hole by drilling a small diameter hole in each of the four corners, and then making the cuts between the holes, will minimise damage to I-Joist.
5. Minimum distance for holes greater than 38mm diameter is 300mm from supports.
6. Do not cut holes larger than 38mm in a cantilever.
7. The length of uncut web between holes must be at least twice the length of the longest adjacent hole dimension.
8. Pre-punched knockouts may be ignored when calculating distances between holes.
9. Hole locations and sizes are based on uniformly, domestic loaded I-Joists. For other conditions please contact your Metsä Wood engineered wood products distributor.

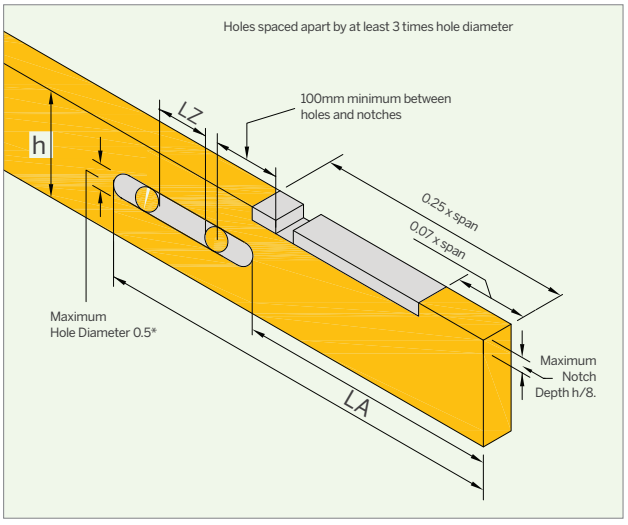
FINNJOIST RECTANGULAR HOLE DISTANCE CHART

Distance from edge of hole to inside edge of supports in mm.

JOIST TYPE	Max H OR W BIGGEST VALUE	SPAN (m)																			
		2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00
200	50	300	300	300	346	503	659	815	971	1128	1284	1440									
	75	347	503	660	816	972	1128	1285	1441	1597	1753	1910									
	100	858	1014	1170	1327	1483	1639	1795	1952	2108	2264	2420									
220	50	300	300	300	300	300	300	358	515	671	827	983	1140	1296							
	75	300	300	300	400	557	713	869	1025	1182	1338	1494	1650	1807							
	100	443	599	755	911	1068	1224	1380	1536	1693	1849	2005	2161	2318							
240	50	300	300	300	300	300	300	300	357	514	670	826	982	1139	1295						
	75	300	300	300	300	300	415	572	728	884	1040	1197	1353	1509	1665						
	100	300	300	448	604	760	917	1073	1229	1385	1542	1698	1854	2010	2167						
	125	636	793	949	1105	1261	1418	1574	1730	1886	2043	2199	2355	2511	2668						
300	50	300	300	300	300	300	300	300	300	334	491	647	803	959	1116	1272	1428				
	75	300	300	300	300	300	300	300	440	597	753	909	1065	1222	1378	1534	1690				
	100	300	300	300	300	300	390	547	703	859	1015	1172	1328	1484	1640	1797	1953				
	125	300	300	300	340	496	653	809	965	1121	1278	1434	1590	1746	1903	2059	2215				
360	50	300	300	300	300	300	300	300	300	300	300	300	324	480	636	793	949	1105	1261		
	75	300	300	300	300	300	300	300	300	300	419	575	731	887	1044	1200	1356	1512	1669		
	100	300	300	300	300	300	300	357	513	670	826	982	1138	1295	1451	1607	1763	1920	2076		
	125	300	300	300	300	300	443	599	755	911	1068	1224	1380	1536	1693	1849	2005	2161	2318		
400	50	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	443	599	756	912
	75	300	300	300	300	300	300	300	300	300	300	300	300	300	382	538	694	850	1007	1163	1319
	100	300	300	300	300	300	300	300	300	300	300	320	476	633	789	945	1101	1258	1414	1570	1726
	125	300	300	300	300	300	300	300	300	415	571	727	884	1040	1196	1352	1509	1665	1821	1977	2134



KERTO®



BEAM DEPTH h [mm]	HOLE ALLOWED ANYWHERE IN CENTRE AXIS h [mm]	DISTANCE FROM BEAM END L_V min [mm]	DISTANCE FROM SUPPORT L_A min [mm]	DISTANCE BETWEEN HOLES L_Z min [mm]	MAX HOLE HEIGHT [mm]
200	20	200	100	300	100
220	22	220	110	300	110
240	24	240	120	300	120
300	30	300	150	300	150
360	36	360	180	360	180
400	40	400	200	400	200

NOTE

For holes <50mm size the Lz = 3d where d is a hole diameter

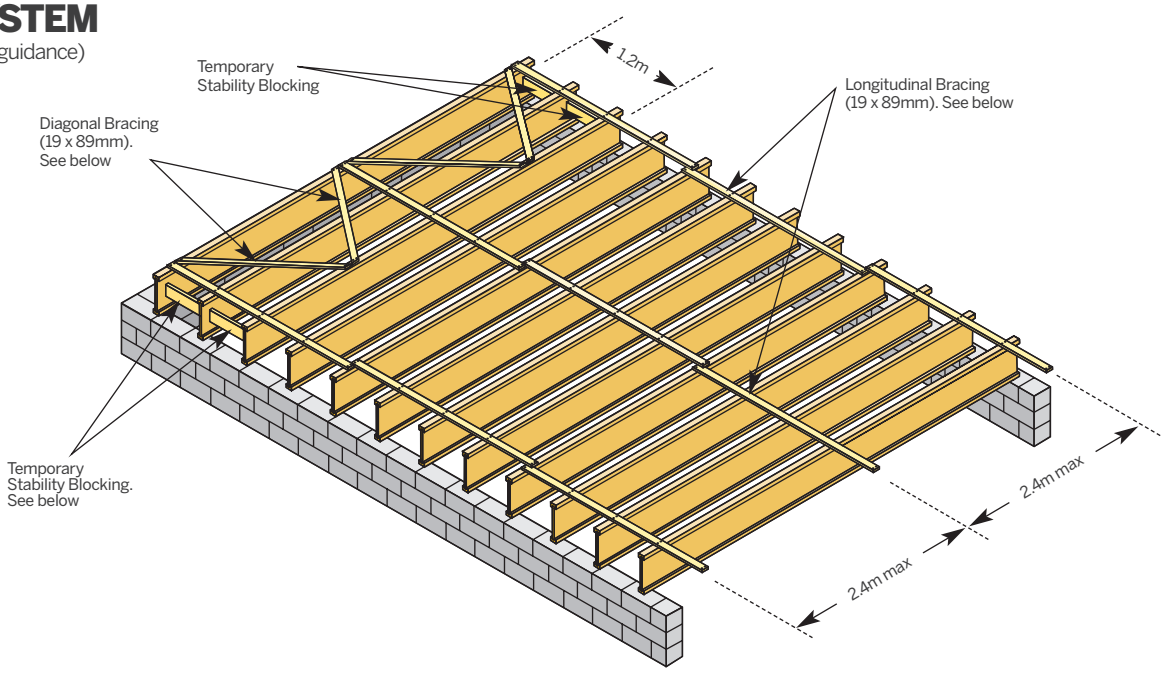
NOTE FOR KERTO®

For holes outside of this contact Metsä Wood Technical Support on 01205 883 835.

TEMPORARY ERECTION

BRACING SYSTEM

(In accordance to UKTFA guidance)



- I-Joists are unstable until laterally braced!
- These instructions are offered as general recommendations and in some instances other and/or additional precautions may be necessary.
- Erection and bracing procedures and the workers' safety are the responsibility of the builder.
- Do not allow workers or construction loads on unbraced I-Joists!
- These details may also be used with timber frame construction.

LONGITUDINAL BRACING

1. Use at least 19 x 89mm bracing members nailed to each I-Joist with two 3.35 x 65mm nails. Use long pieces, not short lengths. Lap the ends to keep a continuous line of bracing.
2. Braces are required at the ends of each I-Joist and at interior supports of continuous I-Joists. Keep the braces parallel and a maximum of 2.4m apart. Longitudinal braces must be tied to a diagonally braced and blocked system at one end of each I-Joist run or joist bay.
3. Additional braces and blocking systems may be required e.g. around stairwell openings.

DIAGONAL BRACING

1. Use at least 19 x 89mm bracing members nailed to each I-Joist with two 3.35 x 65mm nails. Use continuous pieces.
2. Diagonal braces must be installed at one end of each I-Joist run or I-Joist bay. In long joist runs install additional diagonal bracing systems at not more than 10m spacing.
3. Diagonal bracing must be fixed to a minimum of 3 I-Joists to cover a distance of at least 1.2m.

TEMPORARY STABILITY BLOCKING

1. Temporary stability blocking should be a minimum cross section of 38 x 125mm solid timber. Fasten with at least two 3.35 x 65mm nails at each end. Alternatively the required permanent blocking may be fitted e.g. for cantilever joists (see Finnjoist Installation details).
2. Blocking should be cut accurately to length with square ends to maintain Finnjoist centres.
3. Blocking must be fixed between at least 3 I-Joists or to cover a minimum distance of 1.2m.
4. Blocking must be installed at the supports of I-Joists including interior supports of continuous I-Joists where the overall length of the Finnjoist exceeds 6.0m.
5. Blocking must be installed at one end of each I-Joist run or I-Joist bay. In long joist runs install additional blocking systems (temporary stability blocking and diagonal bracing) at not more than 10m spacing.

CONSTRUCTION LOADS

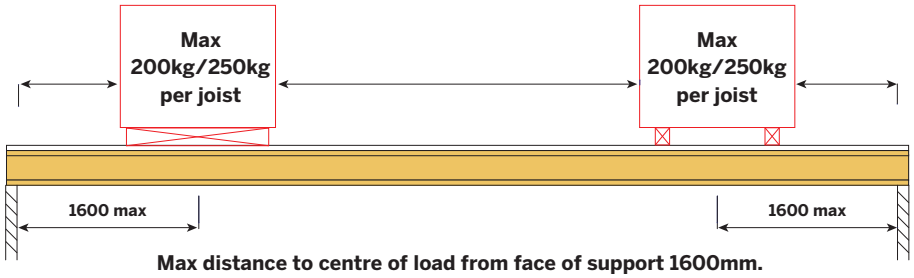
Please contact Metsä Wood Technical Support for guidance on 01205 883 835.

SAFE LOADING OF MATERIALS ON A WORKING PLATFORM

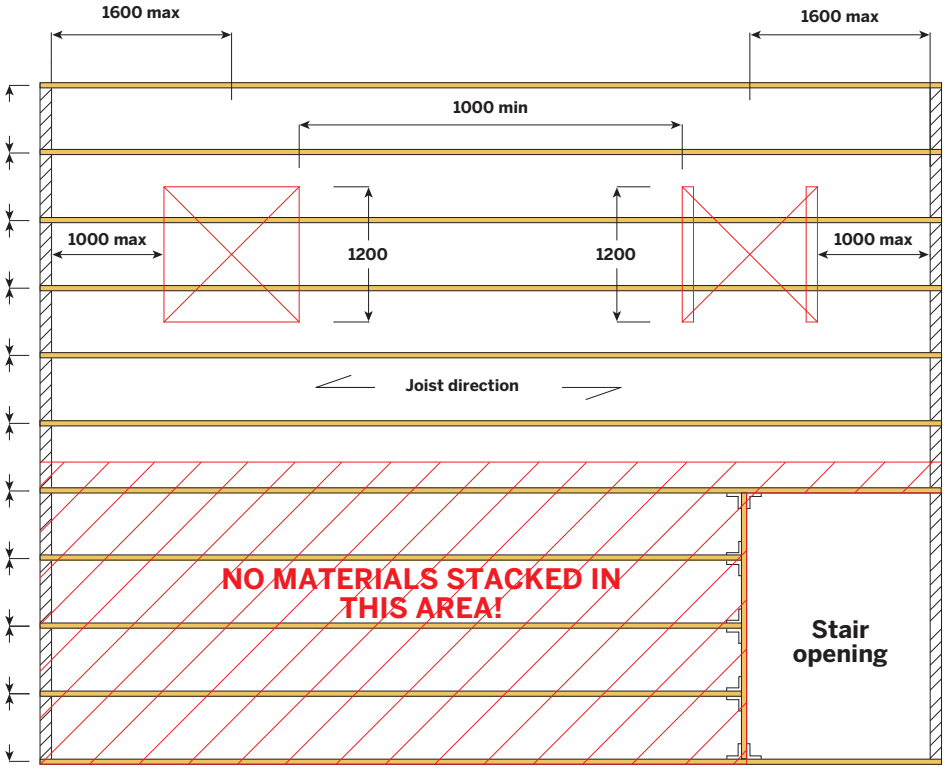
IMPORTANT!! Joists must be fully braced or decked before applying any of the following loads.

200kg per joist depths less than 240mm.

250Kg per joist for joist depths 240mm and greater.



Max distance to centre of load from face of support 1600mm.
Max 2 loads can be applied to 1 joist length, provided they are not more than 1600mm from the face of the wall and minimum of 1000mm between loads as shown.



1. Deflection limit is taken as Span/200. FJI45/240 and lesser joists will deflect more under maximum spans (from span tables) with temporary load.
2. All timber must be kept dry when applying maximum temporary loading.
3. Loads are to be spread equally over a minimum of 2 joists, using timber bearers at min 1200mm in length or a standard 1200 x 1200mm pallet.
4. No loads are to be stacked over any part of the length of joists fixed to an opening header or trimmer joist, such as stair header or SVP trimmer.
5. Plasterboard on the underside is not in place - for multi span beams the bottom flange requires adequate temporary bracing.

Joists supported on hangers may require propping. Please consult your hanger supplier for details.
For any other queries regarding FJI Joists contact Metsä Wood Technical Support on 01205 883 835.

SOUND TRANSMISSION

SOUND DEFINITIONS

AIRBORNE

Airborne sounds are audible noises such as: talking, music, television etc. Airborne sound insulation of party floors and walls is measured as the difference between the noise source in one dwelling and the noise received in the adjacent dwelling. The higher the airborne sound value, the better the airborne sound insulation.

IMPACT

Impact sounds are sound transmissions produced when a construction element vibrates due to direct impact such as walking or jumping. Impact sound is measured as the level of noise received from one room to the next. The lower the impact sound value between rooms the better the impact sound insulation.

SOUND REQUIREMENTS FOR FLOORS

	ENGLAND & WALES AIRBORNE	IMPACT	SCOTLAND & N.IRELAND AIRBORNE	IMPACT	
Single occupancy dwelling	>40dB*	-	>43dB*	-	
Compartment Element**	>45dB	<62dB	>48dB	<65dB	INDIVIDUAL VALUE
	to Robust Detail or on-site testing		>52dB	<61dB	MEAN VALUE

* Achieved in laboratory test.

** On site testing may be required.

Source: Building Regulations Approved Document E (2003).
Scottish Technical Standards Sect 5.2.1 Noise.

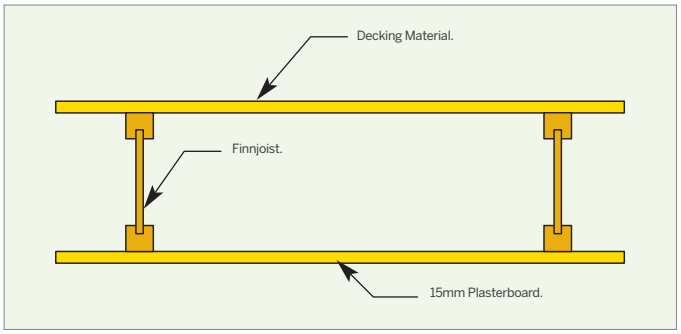
For information on compartment floors please contact Metsä Wood Technical Support on 01205 883 835.

SOUND TESTS RESULTS 2003 - SINGLE OCCUPANCY DWELLING

Rw (dB) FOR AIRBORNE SOUND FJI-DEPTH	18 mm CHIPBOARD		22 mm CHIPBOARD		18 mm METSÄ SPRUCE	18 mm OSB/3	
	NO QUILT	QUILT	NO QUILT	QUILT	QUILT	NO QUILT	QUILT
195/200	-	-	-	40	-	-	-
220	-	-	40	41	-	-	-
240	43	44	43	44	40	40	41
300+	43+	44+	43+	44+	40+	40+	40+

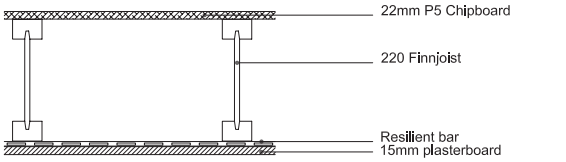
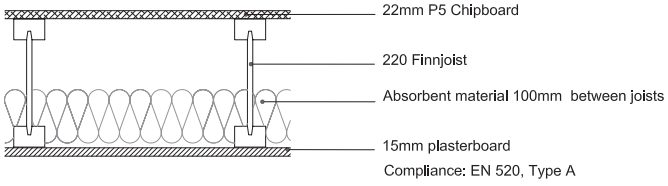
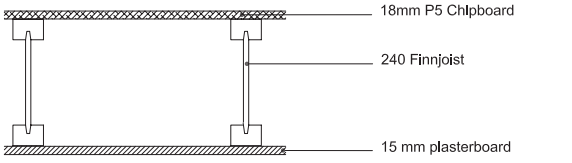
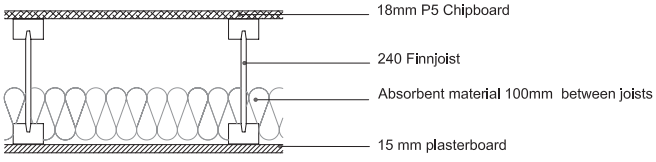
NOTES:

1. Test results achieved November 2003 and July 2004.
2. Minimum of 40dB must be achieved according to English Building Regulations.
3. Tests on a floor construction with joists at both 400mm and 600mm centres achieved the same sound insulation.
4. 40+ indicates not tested but extrapolated.
5. Quilt: min 100mm quilt 10kg/m^2.
6. All tests based on minimum flange width (38mm).
7. 15mm plasterboard (wallboard) 9.9kg/m^3.
8. To improve airborne sound performance we recommend sealing the edges of floor deck to wall with non setting mastic.
9. For further information please contact Metsä Wood Technical Support 01205 883 835.



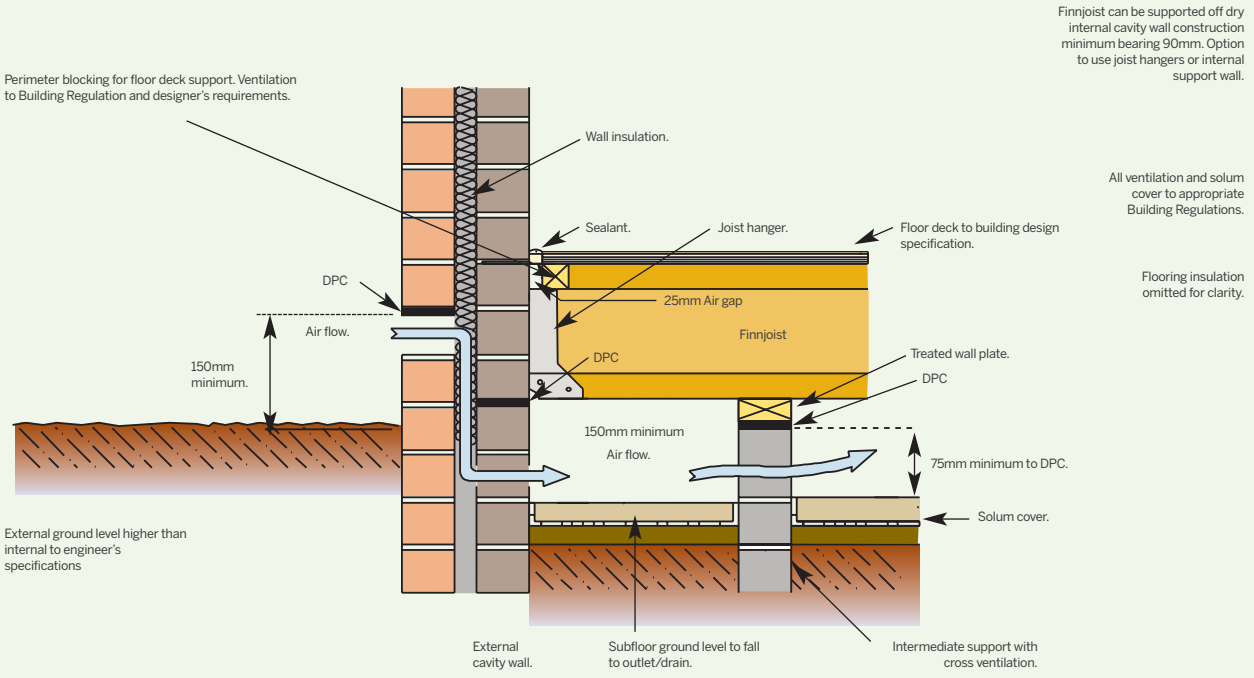
Finnframe solution meets and also exceeds the 43dB acoustic performance Scottish Building Regulations Section 5.2.1. Noise (Successfully tested at 44dB)

ACOUSTIC TEST RESULTS AND CONSTRUCTION DETAILS

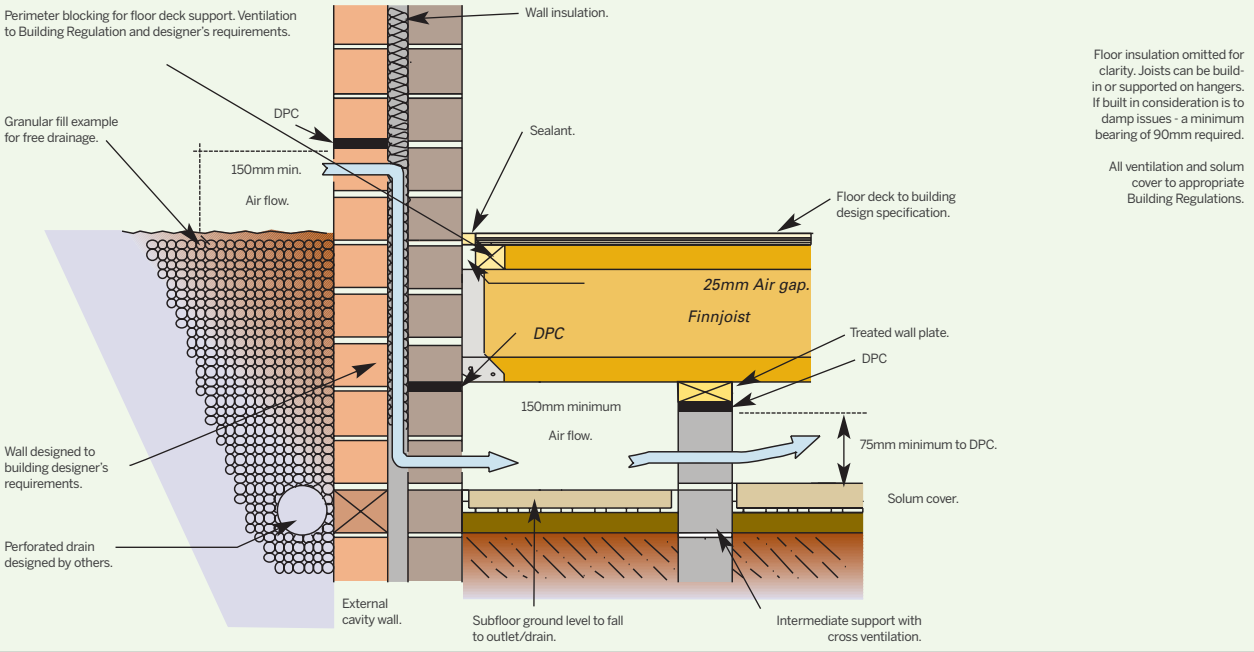
TEST REPORT	TEST NUMBER	CONSTRUCTION DETAIL	R^W (C; C^{TR}) [dB]
274249	L211-022		43 (-3;-9)`
274249	L211-024		44(-2;-7)
c/03/5L/0835/1	11		43 (-2;-5)
c/03/5L/0835/1	9		44 (-1;-5)

GROUND FLOOR INFORMATION

FINNJOIST BEARING - EXTERNAL GROUND BELOW INTERNAL FLOOR
(intermediate support with cross ventilation)



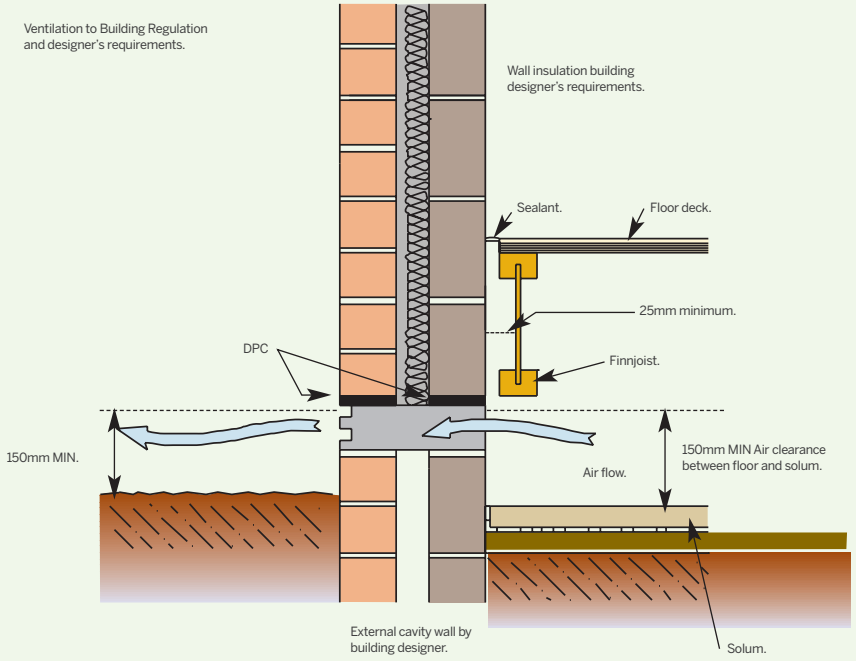
FINNJOIST BEARING - EXTERNAL GROUND ABOVE OR LEVEL WITH INTERNAL FLOOR



NOTES:

1. All ground floors are to be designed to service class 2.
2. Metsä Wood advise designing ground floors to stricter deflection limits due to increased serviceability requirements.
3. Additional bracing may be required to the underside of the I-Joists. Please contact Finnforest Technical Support 01205 883 835.

FINNJOIST PARALLEL WITH EXTERNAL WALL



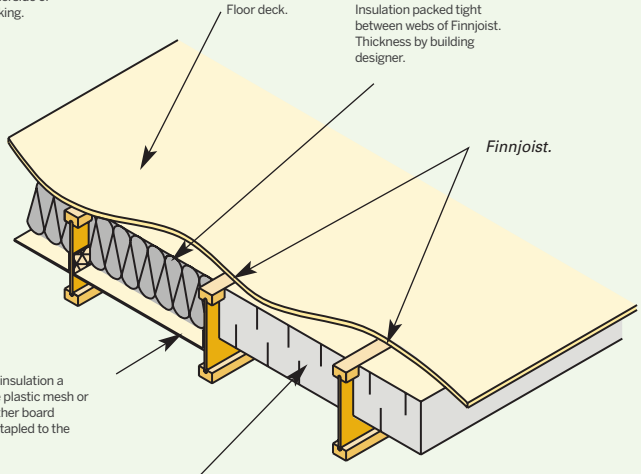
Floor insulation omitted for clarity.

All ventilation and solum cover to appropriate building regulations.

FINNJOIST INSULATION DETAILS

(concept guidance only - specific details by building designer)

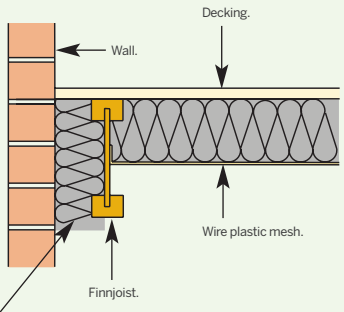
Note:
Insulation to be fitted tight to the underside of the timber decking.



To support the insulation a galvanised wire plastic mesh or approved breather board appropriately stapled to the Finnjoist.

Option for a solid rigid insulation where solid insulation is used ensure it is cut accurately and that there are no gaps. Herringbone strutting not to be used. Fitted to battens for deep joist.

Note:
Vapour control barriers may be required for certain types of floor construction and insulation types.

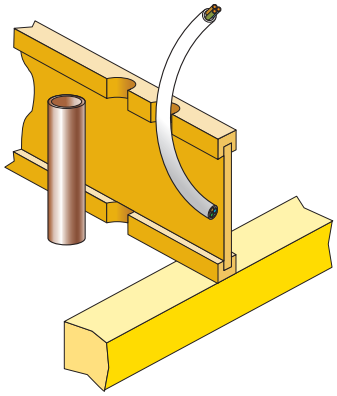


Fix strip of insulation between wall and last joist Min R-value of 0.75m2k/w.

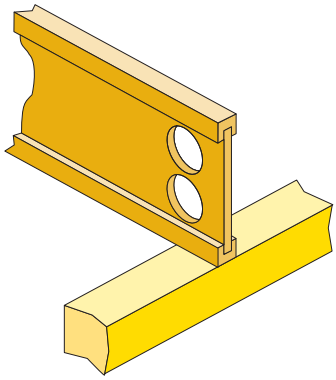
WARNINGS

In order to maintain the performance and efficiency of your Finnjoist please ensure the following warnings are adhered to:

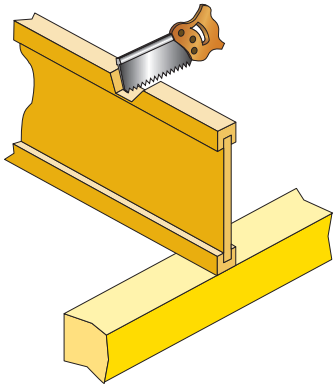
DO NOT cut flange for pipes or cables.



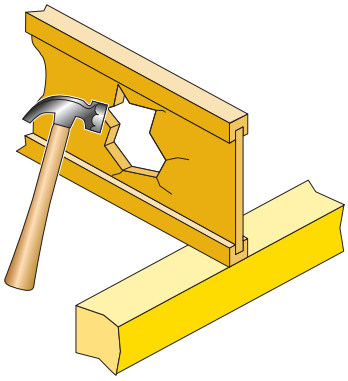
DO NOT put holes too close to supports.



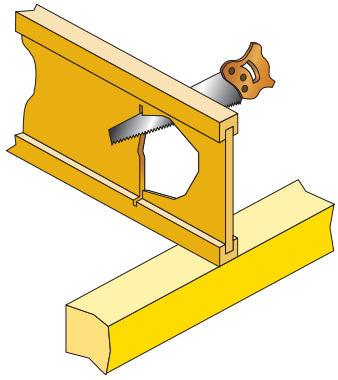
DO NOT cut or notch flange.



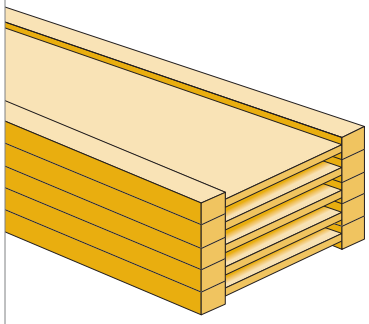
DO NOT make holes with hammer unless knock-out is provided.



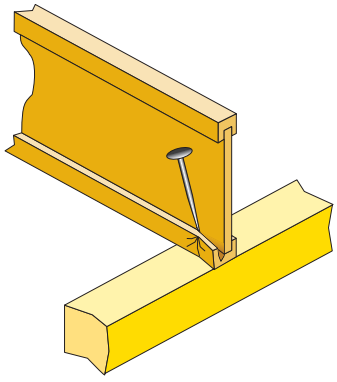
DO NOT overcut hole and damage flange.



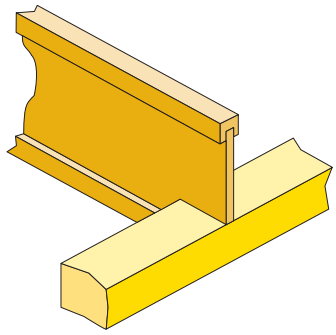
DO NOT store in contact with ground or have extended exposure to sun and water.



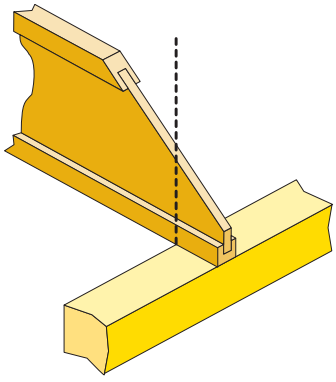
DO NOT use over-sized nails.



DO NOT support I-Joist on web.

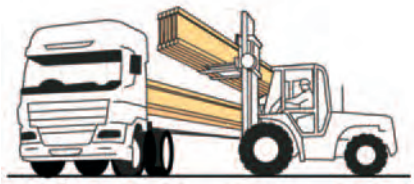


DO NOT cut beyond inside edge of bearing.



HANDLING

DO NOT dump or drop Finnjoists from lorry.



DO NOT lift in the flat orientation.

DO NOT lift Finnjoists by the top flange.

STORAGE

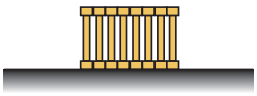
DO protect from weather.

Workers should stay clear when cutting the banding to avoid possible injury from flying banding of toppling joists.

Use bearers adequate to keep Finnjoists above ground and out of mud and water (approximately 3.0m centres).

DO store Finnjoists in vertical orientation.

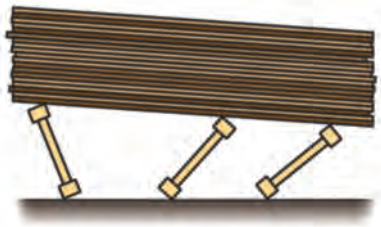
Finnjoists should be left banded together until ready to install.



DO NOT store flat.

On-Site Safety, Joists are unstable until braced laterally.

DO NOT stack building materials on unbraced joists.



DO NOT allow workers to walk on joists until braced INJURY MAY RESULT See Notes 1 and 2.

Lack of concern for proper bracing during construction can result in serious accidents. Erection bracing and procedures, as well as the safety of the workers, are the responsibility of the erector. Under normal conditions if the following guidelines are observed, accidents will be avoided. Please refer to page 28 for more detailed information.

1. All timber blocks, hangers and struts must be completely installed and properly nailed.
2. Lateral restraint must be provided by a diagonally braced and blocked system, comprising a minimum of 3 adjacent joists in each bay. In long bays install additional systems spaced not greater than 10 metres.

MetsäWood

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www.julár.pt

Metsä Wood is a wood products company delivering service-oriented solutions developed in collaboration with its customers. Its premium solutions are based on ecological, high quality Nordic wood as a raw material.

Wood is the only building material that is truly renewable, if well managed. Forest certification schemes give assurance that the timber is legal and from sustainable sources. Metsä Wood sources certified timber over uncertified and is an approved Chain of Custody supplier.

MW0095 AUGUST 13.

The photographs in this brochure are for illustration purposes only.

Metsä Wood reserves the right to change the range without notice.

Every effort has been made to ensure that colours are accurate within the limitations of natural lighting conditions and the four colour printing process.

CE

Kerto® & Finnjoist® are CE compliant.

BM TRADA CERTIFICATION ISO 9001:2008 UKAS 012

BM TRADA CERTIFICATION ISO 14001:2004 UKAS 012

BM TRADA CERTIFICATION BS OHSAS 18001: 2007 UKAS 012