Structural Calculations

For

Timber Fram<mark>e Su</mark>perstructure On

Job title line 1

Job <mark>title l</mark>ine 2

Evaluation copy for Your company

#N/A

TIMBER FRAME DESIGNERS

Your address, Line 1 Your address, Line 2

tel Tel & Fax No.

fax

Client:

#N/A #N/A

#N/A #N/A

#N/A #N/A

Date:

Project Reference: Project Engineer: Checked By:

Date:

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included in the full calculation submiss				

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Wall Foundation Loads - Unfactored							
Wall Ref	Dead kN/m	Total kN/m	Longitudinal	Lateral			
wan itei	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE! #VALUE!	#VALUE! #VALUE!	0.00 0.00	0.00			
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	#VALUE!	#VALUE!	0.00	0.00			
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	#VALUE!	#VALUE! #VALUE!	0.00 0.00	0.00			
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	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			
	#VALUE!	#VALUE!	0.00	0.00			

NOTE 1: Loads given above exclude any external masonry leaf unless it is carried by the timber frame.

NOTE 2: Steel transfer grillages should be designed based upon a maximum deflection of L/360 under total loads.

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Cripple Stud Foundation Loads - Unfactored

Stud Ref	Dead kN	Total kN
Jud IVE	#VALUE!	#VALUE!
	#VALUE!	#VALUE!
	#VALUE!	#VALUE!
	#VALUE!	
		#VALUE!
	#VALUE!	#VALUE!

NOTE 1: Loads given above exclude any external masonry leaf unless it is carried by the timber frame.

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Steel Post Foundation Loads - Unfactored

Post Ref	Dead kN	Total kN
	#VALUE!	#VALUE!

 ${\it NOTE~1: Loads~given~above~exclude~any~external~masonry~leaf~unless~it~is~carried~by~the~timber~frame.}$

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Summary of Stru	ctural Design Philos	ophy		
General Description	on Of Project			
Wind Loading				
		BS 6399 Pt 2, and the folloge found in the calculations.	I owing pressures have be	en used.

Wind Pressure for Building Stability: #DIV/0! kN/m²

Wind Pressure for Panel Design: #DIV/0! kN/m²

Racking Resistance

Racking resistance is provided by a combination of both Category 1 sheathing and plasterboard. Contribution of any masonry has been ignored. Full calculations are again in the main body of the calculations, but the figures given below are a summary.

Wind on Short Elevation Wind on Long Elevation

Resistance Required: #N/A kN Resistance Required: #DIV/0! kN Resistance Provided: 0.00 kN Resistance Provided: 0.00 kN CSF #N/A CSF #DIV/0!

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Summary of Structural Design Philosophy Cont'd

Temporary Bracing

Temporary bracing is normally required for two purposes.

- a) Stud stability during loading out
- b) Wind Stability before all racking resistance is provided.

In the case of a) temporary bracing will always be required if loading out is to take place before the plaster board is fixed. It is usual to fix the plaster board on the uppermost storey and work down, removing the bracing as work proceeds.

In the case of b) there needs to be adequate racking resistance at all times. However in the temporary' condition, until the walls are lined, a reduced wind pressure has been calculated using BS 6399 Pt2. This utilises a two month period and a reduced probability factor. Full calcs are in the main body of the calcs, but a summary is shown.

Design Wind Load:	#DIV/0!	kN/m²	Temporary Wind Load:	0.56	kN/m^2
So Temporary Re	sistance to be:	#DIV/0!	of Design Resistance.		
Wind on Short Elevation			Wind on Long Elevation		
Full Resistance Required:	#N/A	kN	Full Resistance Required:	#DIV/0!	kN
Temp Resistance Required:	#N/A	kN	Temp Resistance Required:	#DIV/0!	kN
Temp Resistance Provided:	0.00	kN	Temp Resistance Provided:	0.00	kN
Therefore:			Therefore:		
#N/A			#DIV/0!		

Masonry Panels Contributing to Stud Capacities

The following masonry values have been taken and should be verified by the client for compatibilty:

							$Max \gamma_f$	1.2
Standard Format Bricks with a minimum compressive strength of:					20	N/mm²	Min γ_f	0.9
Mortar Designat	tion. Class:	iii	Density:	22.00	kN/m³		γm	3.1
Thickness:	102.5	mm		f_k	5.8	N/mm²		
Storey heights of	of masonry:							
Ground:	0.00	m	Third:	0.00	m	Sixth:	0.00	m
First:	0.00	m	Fourth:	0.00	m	Seventh:	0.00	m
Second:	0.00	m	Fifth:	0.00	m			

Cripple Studs and Multiple Full Height Studs

The general requirement for cripple/multiple studs, where a structural rim beam is present, is at window and door reveals to provide additional full height studs, equivalent to those removed by the opening. The additional studs are to be placed beside those framing the openings and are to be equal in number either side.

Where structural rim beams are not present and lintels are provided, the cripple studs will require specific design calcs and these will be found in the relevant section. These cripple studs will be in addition to the full height studs.

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Minimum Structural Deck Thicknesses For 1.5kN/m² Loadings

Intermediate Floors

 400 Joist c/c
 600 Joist c/c

 OSB
 15mm
 18mm

 T&G Boards
 16mm
 19mm

Plywood 15mm 18mm (but check grade)

Particle Board 18mm 22mm Cement Bonded PB 18mm 22mm

Compartment Floors

400 Joist c/c 600 Joist c/c OSB 12mm 12mm T&G Boards N/A N/A Plywood 12mm 12mm Particle Board 15mm 15mm Cement Bonded PB 15mm 15mm

Minimum Strutting Requirements

Solid Joist Span Lines of Strutting

up to 2.5m None

2.5m to 4.5m1 at midspanover 4.5m2 at 1/3 points

Open Web Joist Span Lines of 'Strongback'

up to 3.6m None

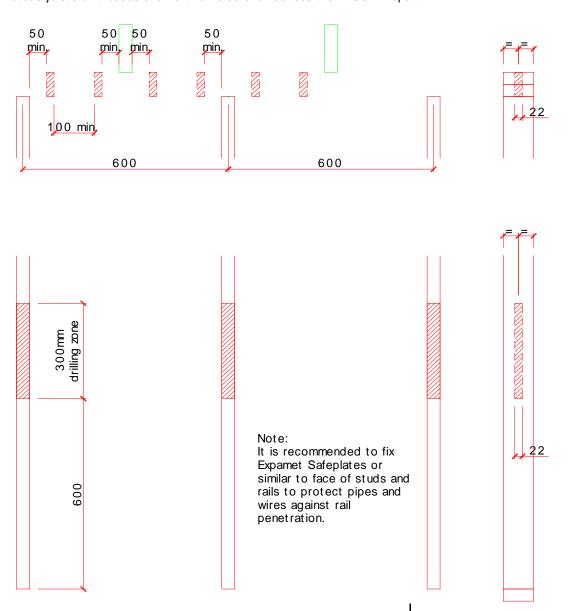
3.6m to 7.2m 1 at midspan

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Notching & Drilli	ing Limits For Studs		

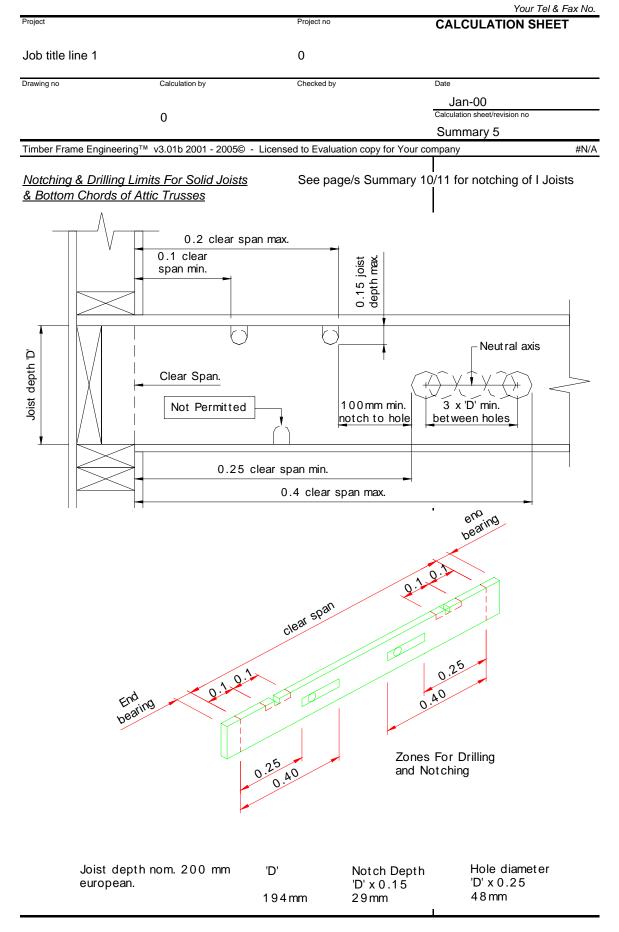
Top Rails and Top Plates.

Any service holes in top rails and top plates shall not exceed 22 mm in diameter and shall be in the centre of rail and plate widths. In any stud bay 200 mm or less one such hole may be provided inany position.

In stud bays in excess of 200 mm, no hole shall be less than 50 mm from the centreline studs joists or trusses and no two holes shall be less than 100 mm apart.



Your address, Line 1 Your address, Line 2



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Differential Movement due to Shrinkage, Creep, Elastic Shortening, Tolerances and Lack of Fit.

In timber frame construction allowances must be made at the interface between the frame and finishes to accommodate for the potential movement that can take place.

This movement is calculated, and itemised in the relevant section of the calculations, but a brief explantion is given here outlining the principal behind the calculations.

Upward Trends: Tolerances and Lack of fit.

All materials and constructions are permitted certain tolerances, and while these are kept to a minimum, they can accumulate over taller buildings. Tolerances usually amount to 1mm on timber in section, such as soleplates and panel rails, and 2mm on stud lengths and rim beams. In addition to this, lack of fit at all interfaces between timbers usually amounts to another 1mm.

These dimensions will effectively increase the storey heights accordingly. This becomes noticable where differing constructions abut. This level will effectively become the starting point for deducting the downward movement.

Downward Trends: Shrinkage, Creep, Elastic Shortening and Lack of Fit.

Downward movements occuring from the above are deemed to start from the point of highest upward movement. Shrinkage occurs when the moisture content reduces during drying out and typiaclly takes place rapidly during the first 12 months and then at a slower rate over the following 2 to 3 years. Elastic shortening takes place when loads are applied, such as dry lining, floating floors during construction, and occupancy after completion. Creep is a longer term effect due to the nature of the material. The lack of fit at interfaces will diminish once load is applied and will reduce in a short period during construction.

Conclusion.

Allowance must be made in the finishes, cladding and adjoining construction for these movements or deterioration will result. Consideration must also be given to the relative soleplate levels of differing areas. Eg. one area may start at first floor level being supported of a steel frame. This will cause a plane of differing movement characteristics that should be accounted for.

Reference should also be made the TRADA guidebook Timber Frame Construction 3rd Edition for allowances to be made around window and door openings and at eaves level.

Typically

25% during construction 50% during the first 12 months 25% over the next 2 - 3 years

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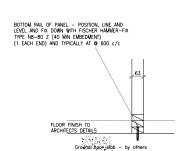
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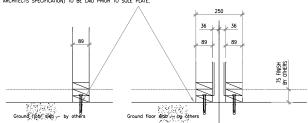
Disproportionate Collapse

The building is not subject to disproportionate collapse requirements.

Ground Floor Soleplate Fixings - Solid Concrete Slab



Position sole plate on dPC – line and level α fix down with fischer thankier-fix type nto-100 z (or coull approved) with 50 min cheedwent 2 no min (1 each em) typically θ 600 c/c. Sole plate packing if necessary to be continuous and non-shrinkable. Dec (10 architects seccipicand) to be lad prode to 50le plate.



INTERNAL NON-LOADBEARING PARTITION

INTERNAL LOAD-BEARING WALL

COMPARTMENT/ PARTY WALL

FIXINGS SHOWN INDICATIVE ONLY

Fischer Hammer-fix		Drill	Min. drill hole depth with push-thro	Min. drill anchorage depth	Plug length	Max. object thickness	Fischer Nail screw
Type		Ømm	assly	mm	mm	mm	mm
Count ersunk	Pozidriv head						
N10 x 100 Z	50346	10	115	50	100	50	7 x 110
N8 x 80 Z	50358	8	95	40	8.0	40	5 x 85

(Fixings to be installed in accordance with manufacturers recomendations - minimum of 2 no. fixings to any length of sole plate)

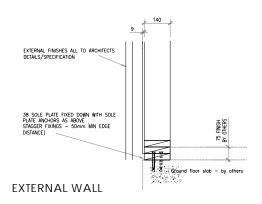
GENERAL NOTES

ALL G.F. FLOOR SOLE PLATES = 0/OF strength class C16 TIMBERS - PRESERVATIVE TREATED TIMBER

SIZES AS NOTED ON LAYOUTS

U/S SOLE PLATE LEVEL IS TAKEN AS THE TOP OF STRUCTURAL FLOOR SLAB (BEAM & BLOCK FLOOR + FINISHES - BY OTHERS)
THIS IS ASSUMED TO BE AT A CONSTANT LEVEL AND THAT ANY DISCREPANCIES HAVE BEEN TREATED TO GIVE A CONSTANT LEVEL BASE FOR THE SOLE PLATE TO FIX TO.

ENSURE FIXINGS ARE MADE DIRECTLY INTO BLOCK FOUNDATION WALLS OR INFILL BLOCKS OF PRECAST BEAM AND BLOCK FLOOR. IF CLASH OCCURS – FIX ADDITIONAL ANCHOR IN AN AVAILABLE LOCATION. INFILL BLOCKS LOCAL TO LOADBEARING WALLS TO BE WELL GROUTED INTO PLACE TO FOUNDATION ENGINEERS DETAIL PRIOR TO FIXING SOLE PLATE DPC (TO ARCHITECTS SPECIFICATION) TO BE LAID PRIOR TO SOLE PLATE.



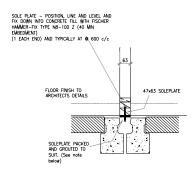
TYPICAL GROUND FLOOR SOLE PLATE FIXING DETAILS

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#N/A

Ground Floor Soleplate Fixings - Beam & Block Floor



INTERNAL NON-LOADBEARING **PARTITION**

SOLE PLATE POSITION OPC - LINE AND LIDEL & FIX DOMN WITH FISCHER POSITION SOLE PLATE ON OPC - LINE AND LIDEL & FIX DOMN WITH FISCHER HAMBER-FIX TYPE (AS -100 Z (OR EDUAL APPROVED) WITH 50 MIN EMBEDMENT 2 No MIN (I FACH END) TYPICALLY • 600 $_{\rm C}$ /C. SOLE PLATE PACKING IF NECESSIAY TO BE CONTINUOUS AND NON-S-HRINKABLE DOME (TO ARCHIESTS SPECIFICATION) TO BE LUO PRORT TO SOLE PLATE FLOOR FINISH TO ARCHITECTS DETAILS 7x89 SOLEPLATE

INTERNAL LOAD-**BEARING WALL**

COMPARTMENT/ PARTY WALL

FIXINGS SHOWN INDICATIVE ONLY

Fischer Han	nmer-fix	Drill Ø mm	Min. drill hole depth with push-thro assily	Min. drill anchorage depth mm	Plug langth mm	Max object thickness mm	Fischer Nail screw mm
Countersunk	Pozidriv head						
N8 x 100 Z	50357	8	115	40	100	60	5 x 105

(Fixings to be installed in accordance with manufacturers recomendations - minimum of 2 no. fixings to any length of sole plate)

GENERAL NOTES

ALL G.F. FLOOR SOLE PLATES = O/OF strength class C16 TIMBERS - PRESERVATIVE CCA TREATED TIMBER

SIZES AS NOTED ON LAYOUTS

U/S SOLE PLATE LEVEL IS TAKEN AS THE TOP OF STRUCTURAL FLOOR SLAB (BEAM & BLOCK FLOOR + FINISHES - BY OTHERS) THIS IS ASSUMED TO BE AT A CONSTANT LEVEL AND THAT ANY DISCREPANCIES HAVE BEEN TREATED TO GIVE A CONSTANT LEVEL BASE FOR THE SOLE PLATE TO FIX TO.

ENSURE FIXINGS ARE MADE DIRECTLY INTO BLOCK FOUNDATION WALLS OR INFILL BLOCKS OF PRECAST BEAM AND BLOCK FLOORS, WILABLE LOCATION, INFILL BLOCKS LOCAL TO LOADBEARING WALLS TO BE WELL GROUTED INTO PLACE TO FOUNDATION ENGINEERS DETAIL PRIOR TO FIXING SOLE PLATE DOEC (TO ARCHITECTS SPECIFICATION) TO BE LAID PRIOR TO SOLE PLATE.

SOLE PLATE SOLE PLATE POSITION SOLE PLATE ON DPC - LINE AND LEVEL & FIX DOWN WITH FISCHER HAMMER-RIX PIER 183-100 Z (OR COUAL APPROVED) MIN SOMM EDGE DISTANCE WITH 50 MIN ELECTRON OF MCESSARY TO BE CONTINUOUS AND NON-SHINMABLE. DPC (TO ARCHITECTS SPECIFICATION) TO GE LAD PRIOR TO SOLE PLATE 47x140 SOLEPLATE EXTERNAL WALL FINISHES TO ARCHITECTS DETAILS PACKING AND GROUTING SOLE PLATE MAXIMAM PACK SZE TO BE 20mm THK, PACKS AT WAX 500 CTRS AND TO BE ETHER SLATE OR A THIRD PARTY APPROVED PACKING MATERIAL U/S OF SOLEPLATES TO BE GROUTED WITH A PROPRIETARY ROWSHIMM CROUT BECOME ENECTION OF WALL PARKES.

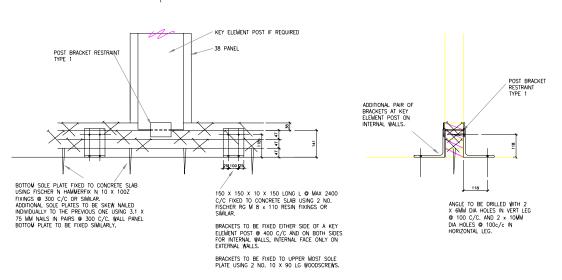
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Ground Floor Multiple Soleplate Fixings

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ELEVATION SECTION A-A

#N/A

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Racking Resistance With Wind on Long Elevation

Ground floor only

Wall Ref	0	0	0	0	0	0
Length (m)	0.00	0.00	0.00	0.00	0.00	0.00
Height (m) (MAX 2.7m)	0.00	0.00	0.00	0.00	0.00	0.00
Agg.area of openings (M ²)	0.00	0.00	0.00	0.00	0.00	0.00
UDL (kN/m)	0.00	0.00	0.00	0.00	0.00	0.00
Masonry Length (m)	0.00	0.00	0.00	0.00	0.00	0.00
Tie Density (x/M²)	0.00	0.00	0.00	0.00	0.00	0.00
Primary Board						
Material	None	None	None	None	None	None
Thickness (mm)	0.00	0.00	0.00	0.00	0.00	0.00
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						
Secondary Board	0	0	0	0	0	0
Material	None	None	None	None	None	None
Thickness (mm)	0.00	0.00	0.00	0.00	0.00	0.00
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						

Racking Resistance With Wind on Short Elevation

Ground floor only

Wall Ref	0	0	0	0	0	0
Length (m)	0.00	0.00	0.00	0.00	0.00	0.00
Height (m) (MAX 2.7m)	0.00	0.00	0.00	0.00	0.00	0.00
Agg.area of openings (M ²)	0.00	0.00	0.00	0.00	0.00	0.00
UDL (kN/m)	0.00	0.00	0.00	0.00	0.00	0.00
Masonry Length (m)	0.00	0.00	0.00	0.00	0.00	0.00
Tie Density (x/M ²)	0.00	0.00	0.00	0.00	0.00	0.00
Primary Board						
Material	None	None	None	None	None	None
Thickness (mm)	0.00	0.00	0.00	0.00	0.00	0.00
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						
Secondary Board						
Material	None	None	None	None	None	None
Thickness (mm)	0.00	0.00	0.00	0.00	0.00	0.00
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						

#N/A

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Racking Resistance With Wind on Long Elevation

First floor and above if applicable

					if applicable	
Wall Ref	0	0	0	0	0	0
Length (m)	0.00	0.00	0.00	0.00	0.00	0.00
Height (m) (MAX 2.7m)	0.00	0.00	0.00	0.00	0.00	0.00
Agg.area of openings (M ²)	0.00	0.00	0.00	0.00	0.00	0.00
UDL (kN/m)	0.00	0.00	0.00	0.00	0.00	0.00
Masonry Length (m)	0.00	0.00	0.00	0.00	0.00	0.00
Tie Density (x/M²)	0.00	0.00	0.00	0.00	0.00	0.00
Primary Board						
Material	None	None	None	None	None	None
Thickness (mm)	0.00	0.00	0.00	0.00	0.00	0.00
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						
Secondary Board						
Material	None	None	None	None	None	None
Thickness (mm)	0.00	0.00	0.00	0.00	0.00	0.00
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						

Racking Resistance With Wind on Short Elevation

First floor and above

					п аррпсаые	
Wall Ref	0	0	0	0	0	0
Length (m)	0.00	0.00	0.00	0.00	0.00	0.00
Height (m) (MAX 2.7m)	0.00	0.00	0.00	0.00	0.00	0.00
Agg.area of openings (M ²)	0.00	0.00	0.00	0.00	0.00	0.00
UDL (kN/m)	0.00	0.00	0.00	0.00	0.00	0.00
Masonry Length (m)	0.00	0.00	0.00	0.00	0.00	0.00
Tie Density (x/M²)	0.00	0.00	0.00	0.00	0.00	0.00
Primary Board						
Material	None	None	None	None	None	None
Thickness (mm)	0.00	0.00	0.00	0.00	0.00	0.00
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						
Perimeter Nail Spacing (mm)						
Material	None	None	None	None	None	None
Thickness (mm)	0.00	0.00	0.00	0.00	0.00	0.00
Thickness (mm)						
Perimeter Nail Spacing (mm)						

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Timber Frame I	Engineering™	v3.01b 2001 - 20	05© - Licensed	d to Evaluation c	opy for Your co	mpany		#N/A
Stud Desigr	Summary							
Wall Ref	Calc Page	Dead kN/m	Total kN/m	Stud Width	Stud Depth	Centres	Fire Ratio	CSI
Ground Floor V	<u>Valls</u>							

First Floor Walls

Second Floor Walls

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Cripple Stud	l Design Sum	mary				No. of Studs		
Stud Ref Ground Floor W	Calc Page <u>/alls</u>	Dead kN	Total kN	Stud Width	Stud Depth	CS/FH	Grade	CSI

First Floor Walls

Second Floor Walls

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<u>Differential Mover</u> Total Differential Move						
		4th Floor	3rd Floor	2nd Floor	1st Floor	
Relative Reduction du	e to DS, C & ES at FFL:	0.0	4.9	8.6	9.3	
Reduction Across Floo	r Zone:	0.0	1.7	6.4	6.4	
Accumulative Reduction	on at FFL:	0.0	22.9	17.9	9.3	
Window Cill/Head Acc	umulative Reduction	0.0	22.9	21.2	12.4	
			Roof	6th Floor	5th Floor	
Relative Reduction du	e to DS, C & ES at FFL:		0.0	0.0	0.0	
Reduction Across Floo	r Zone:		0.0	0.0	0.0	
Accumulative Reduction	n at FFL:		0.0	0.0	0.0	
	umulative Reduction		N/A	0.0	0.0	

Party Wall Ties

	Cullen ST	TR 30 x 2.5	Special T	īes 75 x 3
Floor Level	Single/Double	Centres (mm)	Single/Double	Centres (mm)
Roof	Single	0	Single	0
5th Floor	Single	0	Single	0
4th Floor	Single	0	Single	0
3rd Floor	Single	0	Single	0
2nd Floor	Single	0	Single	0
1st Floor	Single	0	Single	0

Headbinder Design

Headbinder Design - Condition 1 - Party wall	2	Stud & joist alignment not critical
Headbinder Design - Condition 2 - External wall	2	Stud & joist alignment not critical
Headbinder Design - Condition 3 - Internal wall	2	Studs & joists to align
Headbinder Design - Condition 4 - Internal wall	2	Studs & joists to align
Headbinder Design - Condition 5 - Roof	2	Studs & trusses to align

No. of rails Result

Project Project no **CALCULATION SHEET** Job title line 1 0 Drawing no Calculation by Checked by Jan-00 Calculation sheet/revision no 0 Summary 15 Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A Fixing Detail Between Panels & Soleplate/Rim Beam Type: Screwed Panel rail thickness: 38 mm Min Soleplate thickness: 38 mm PANEL Deck thickness: 22 mm NAIL SPACING AND EDGE DISATNCES AS 1st Soleplate to Rim Beam Fixings 3 mm Screw diameter used: NAIL SPACING AND EDGE DISATNCES AS SPECIFIED INTO CENTRE OF RIM BEAM. **BOTTOM RAIL** 110 mm Screw length used: Note, if required this can be double nails **SOLE PLATE** in pairs at double the spacing. Headbinder thickness: 38 mm DECKING Panel rail thickness: 38 mm RIM BOARD JOISTS TO HEADER/RIM BOARD - NAIL WITH 4.50×100 2 No END FACE NAILED Ground to 3rd Floor Level Screw arrangement: Pairs LINE OF SKEW NAILING BETWEEN RIM BEAM AND BLOCKING EQUVIALENT TO THE NAIL SPACING AND SPECIFICATION. Screw Spacing: 150 mm HEAD BINDER 3rd to 6th Floor Level TOP RAIL NAIL SPACING AND EDGE DISATNCES AS SPECIFIED. 0 Screw arrangement: Screw Spacing: 0 mm Panel Rail / 2nd Soleplate to PANEL TO FLOOR DECK/PANEL 1st Soleplate Fixings NAILING - EXPLODED VIEW Screw diameter used: 3 mm Screw length used: 90 mm Headbinder thickness: 38 mm Panel rail thickness: 38 mm Ground to 3rd Floor Level Screw arrangement: **Pairs** FLOOR FINISH TO Screw Spacing: 150 mm ARCHITECTS DETAILS 3rd to 6th Floor Level Screw arrangement: 0 SOLEPLATE PACKED Screw Spacing: 0 mm AND GROUTED TO SUIT. (See note) LOAD- BEARING WALL 1st Soleplate to Concrete Slab Fixings SOLEPLATE FIXING TO Screw diameter used: 5 mm **CONCRETE SLAB** Screw length used: 125 mm Screw arrangement: Single mm

and screws, singles / pairs and skew / vertical are shown. Fischer Hammerfix Ref N8 x 120Z

Screw Spacing:

200 mm

NOTE: The above sketch is diagramatic as far as nails

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<u>I Joist Desig</u>	n Summary Profile	Centres (mm)	Span 1	Span 2	Deflecti Total	ons (mm) Imposed	Unfactored Support Reactions (kN) End Int

Beam Design Summary

Beam Ref Section Span (m) Grade / No. Off Calc Page

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#N/A

Notching & Drilling Limits For Boise Cascade I Joists

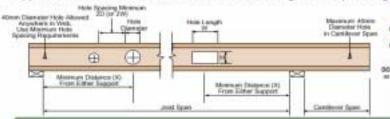
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BCI[®] Joists — Floor Applications

21

Hole Location and Sizing

BCI* Joists are manufactured with 38mm round prestamped knockouts in the web at approx. 305mm centres for ventilation, electrical wiring or small plumbing.

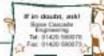




BCI Joint	joist Span		CIRCULAR HOLES Hole Diameter (mm)					RECTANGULAR HOLES									
Depth (rem)	0m0 2.0	7%	1008	125	156	170	- 300	230	100w100	125×290	190r190	150x300	175w180	3004280	200mm00	250x250	250x36
	2.0	- D.B.:	-0.4	9.4	-0.4	1-4	-6-1		0.0	0.4	0.4	0.6	+		-+	+-	- 4
245mm	3.0	0.3	0.4	0.4	0.8	/4	9.1	- 4	0.0	0.7	44	3.4	4	3.00	1.4	4	-6
Section 1	4.0	03	33.6	47	1.2	1.6	120	1.4	20.6	1.1:	12.	-1.2	16	53.415	UA	6	Ch
	5.0	0.0	2.6	1.8	1.1	583	2.0	-	1.2	1.8:	4.8.	23	100	0300	24		-
	3.0	0.3	-0.4	9.4	.0.4	0.4	0.4	1-0	-0.0	0.4	-94	6.5	0.7	4.5	.13	4.	-
302	4.0	0.9	70.6	ILK:	0.6	24	0.8	014	30.9	9.76	18.5	4.1	1.1	4.1	21.9	122	22
20,200	5.0	8.8	18.6	5.6	11.0	3.3	1.6		11.0	1.1:	0.1	12	1.6	141	2.0	-	110
	6.6	0.5	0.4	5.6	0.8	13	100	1040	0.9	18.	2.4	20	2.1	1.8	2.76	-	170
71.55.1	2.0	0.3	0.4	3.4	0.4	3.4	- 64	8.4	0.4	2.4	-0.4	85	0.5	2.4	0.8	-24	1.5
356	4.0	-0.8	0.4	8.4	6.4	0.4	0.4	-0.6	-0.0	8.8	0.4	3.8	24	47.	1.5	12-	1.6
300mm	5.0	0.0	0.4	0.4	0.4	0.4	an-	1.0	0.0	1.0	2.0	-14	1.0	1.3	21	1.8	II
	6.0	0.5	0.4	3.6	11.00	-0.6		1.0		1.6	- 1.4	1.0	2.1	1.8	27	2.4	
	3.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	24	0.5	0.5	2.4	6.5	5.4	2.6
144	4.0	0.3	0.4	0.4	0.4	25.4	0.4	0.4	0.0	6.4	-04	2.5	2.0	6.4	1.1	9.7.	8.9
406	5.0	6.8	0.4	8.4	0.4	9.4	0.4	84	0.5	8.6	64	2.00	1.0	8.7	1.0	1.2	1.T
	6.0	0.9	0.4	4.4	0.4	4.4	0.6	0.0	- 83	1.6	5.0	14	14	13	22	18	23

Notes:

- Table assumes floor loading of 1.5 kNim' live load and 0.75 kNim' dead load, with worst case joint spacing of 600mm.
- For conditions with greater loads, refer to BC Calc* sizing software or Boise Cascade Engineering.
- Spacing between holes must be at least twice the greatest dimension of the largest hole.
- Cut all holes carefully, do not overcut or cut the joist flanges.
- * A 40mm circular hole may be cut anywhere in the joist web.



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Loading Schedule							
<u>Compartment Floor Wi</u> Dead	th Integral C Density	<u>eiling</u> Thickness	Applicable			kN/m2	
Jeau	Delisity	HIICKHESS				KN/IIIZ	
						0.000	
Chipboard	750	22				0.165	
Plasterboard	950	19				0.181	
Acoustic Battens	100	54				0.054	
OSB deck	750	18				0.135	
Insulation	20	100				0.020	
Plasterboard		19				0.162	
Plasterboard		12.5				0.106	
Plasterboard & battens						0.000	
Services						0.000	
Joists	L	219	44]	600	0.085	
oad-bearing partitions						0.270	
mposed							
Self contained dwelling	g units	(Bedrooms)		kN PL	or	1.500	0
		(Communal)	#IN/A	kN PL	or	#N/A	0
				Total		2.68 KN/n	n²
						ratio dead/total	
						0.440	
ntermediate Floor	Applicable						
Dead	Density	Thickness				kN/m2	
Finishes						0.000	
Chipboard deck		22		1		0.000 0.164	
Plasterboard						0.153	
Insulation						0.040	
Joists			38		400	0.121	
oad-bearing partitions		241	30	j	400	0.121	
oau-bearing partitions						0.749	0
						0.7 10	Ü
mposed							
Self contained dwelling	g units	(Bedrooms)		kN PL	or	1.500	0
		(Communal)	#N/A	kN PL	or	#N/A	0
				Total		2.25 KN/n	n ²
						ratio dead/total	
						0.333	

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Floors - continued Compartment Floor V		Ceiling	Not applicable			
Dead	Density Density	Thickness	Tvot applicable		kN/m2	
	750	22				
	850	19				
	100	30				
	750	15				
	530	302	44			
	50	100				
	850 850	19 12.5				
	530	250	76			
	0.50	40				
	850	12				
Imposed						
		(Bedrooms) (Communal)				
		,	,			
			:	Total	ratio dead/total	
					#VALUE!	
Roof Construction	าร					
Flat Roof Applicable						
Dead	Density	Thickness			KN/m2	
Sarna	fil 750	4		1	0.030	
Insulatio		85			0.128	
Plywood ded		18			0.095	
•					0.000	
Insulatio		150			0.030	
Plasterboar	' d 850	12.5			0.106	
jois	st 530	245	44	centres 400	0.143	
Je		2.10			0.532	0.532
Impaced						
Imposed all					0.600	
uii		E	ffective Snow	v Drift Loads	0.630	
				Total	4.40	2
			:	Total	1.13 KN ratio dead/total	
					0.470	

Your address, Line 2 Your Tel & Fax No. Project Project no **CALCULATION SHEET** Job title line 1 0.00 Drawing no Calculation by Checked by Jan-00 Calculation sheet/revision no 0 L3 Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A **Roof Constructions - continued** Pitched / Curved Roof Applicable Slope / Average Slope: 50.0 degrees **Dead** (on slope area) **Density Thickness** centres KN/m2 (on slope area) **Olway Reconstituted** slates Tiles 2000 30 0.755 100 **Battens & Felt** 530 25 30 0.040 Truss Rafters / Rafters 530 38 450 600 0.151 Insulation 50 200 0.100 **Plasterboard** 850 15 0.128 0.000 0.000 0.000 1.173 1.173 On Slope 1.825 On Plan 1.825 100.00 m² **Imposed** Roof area External roof slope 0.250 Other 0.250 Internal Truss type: Truss span: 7.70 m For attic trusses only: Total 2.33 KN/m² 5.00 m Dim'n between verticals: Average imposed load: 0.97 kN/m^2 ratio dead/total 0.785 **External Balcony** Applicable **Dead Density Thickness** KN/m2 **Asphalt** 2400 25 0.600 Membrane 750 4 0.030 **Insulated Panel** 150 85 0.128 Plywood deck 530 18 0.095 **Firings** 530 25 0.133 Insulation 20 0.030 150 **Plasterboard** 850 25 0.213 Sec. Ceil & Serv. 0.000 **Joists** 530 235 38 400 0.118 0 1.346 **Imposed** all 1.500 0 2.85 KN/m² Total ratio dead/total 0.473

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Wall Constructions							
Dents Mall	Damaitu	Thislman			I/NI/ 0		
Party Wall Applicable	Density	Thickness	width	centres	KN/m2		
Plasterboard	850	19			0.162		
Plasterboard	850	12.5			0.106		
OSB		10			0.075		
Studs	530	89	38	400	0.045		
Plasterboard	850	0			0.000		
Insulation	20	150			0.030		
							_
			Valu	e for 1 Leaf	0.418	KN/m ²	•
LI	2.0	m	air roo	Total	1 17	I/NI/m rum	-
Ht=	2.8	Ш	gives	Total	1.17	KN/m run	•
Load-bearing Internal w	alls						
			width	centres	KN/m2		
Plasterboard (optional)					0.000		
Plasterboard	850	15			0.128		
Studs	530	89	38	400	0.045		
OSB	750	9			0.068		
Insulation	20	150			0.030		
Plasterboard	850	15			0.128		
Plasterboard (optional)					0.000		
					0.397	KN/m2	-
							=
Non Load-bearing Inter	aal walla /D	ortitions)					
Build up as Load Bearing walls b			sterhoard e f				
· ·	m, this is:	•	KN/m run	over 1.6m	0.49	KN/m ²	
If this value is deemed in				0.27		KN/m ²	-
ii iiis vaide is decilied ilie	арргорпаке (iso, criter ric	value.	0.21	0.21	TXIN/III	•
External Wall	Density	Thickness	width	centres	KN/m2	Eccentricity	
						(If applicable)	
Plasterboard	850	15			0.128		
0(1-	500	444	00	400	0.000		
Studs	530	114	38	400	0.057		
OSB	750	9 105			0.068		
Insulation	20	105			0.021		m
					0.000		mm
					0.000 0.000		mm mm
Note: the accontricities of	ra from food	of stud NOT	the cheethin	a			
Note: the eccentricities an				y.		KN/m² KN/m run	•
Ht=	2.8	Ш	gives		0.77	rxin/III I'UII	

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Timber Frame Engineering	V3.01b 2001 - 2003@ - Lic	enseu t	D Evaluation C	opy for Tour co	mpany #N/A
Wind Loading - Bu		8			
Permanent Condition					
This calculation is based upo	-			lethod as noted	t holow
Dynamic Classification	Standard	Metrio	u or nybria w	i etnoù as notet	l below
Building H	eight		11.65	m	
_	ype Factor, Kb		0.5	(Timber Frame	ed Buildings)
	Augmentation Factor, C	r	0.011		
0	Lega				
Standard Method Calcu	ulation		Drighton		
Location	d Speed,Vb		Brighton 22.00		(see fig. 6)
Site Altitud	•		87.00		(Base Altitude for Hybrid Method -
Altitude Fa			1.09	111	- refer to cl. 3.2.3.4.10)
Direction F			1.00		
Season Fa			1.00		
Probability	Factor, Sp		1.00		
Effective Height					
	Height, Hr		11.65	m	
Terrain	r roight, r n		Country		(see Note 1 below)
	loof Top Height, Ho		0.00	m	,
_	pwind Spacing, Xo		0.00	m	
Effective H	leight, He		11.65	m	
Effective Wind Speed					
	stance to Sea		55	km	(see Note 1 below)
Site Wind			23.91		(see table 4 for Standard Method)
Terrain Fa	•		1.717	, 0	Sb is taken from table 4
	Vind Speed, Ve		41.06	m/s	without interpolation.
Interpolate	ed Value of Sb (if reqd.)				Enter interpolated value if
				•	reqd.
Dynamic Pressure -	No wind angle			kN/m ²	4 004
	At wind angle		#N/A	kN/m ²	<u>Use 1.034</u> kN/n
Additional Details to BS 6399): Part 2: 1997 - Hybrid Metl	hod - ((Cl. 1.8.4 option	nb)	
B E . O.A.					
Direction Factor, Sd for	angle	270		(Worst case)	Hybrid Method Used:
Gust Peak Factor, g _t Fetch Factor, S _c (<i>Table 2</i>	22)		3.44 #N/A		
Fetch Adjustment Factor	·		#N/A		
Turbulance Factor, S _t (#N/A #N/A		
Fetch Adjustment Factor	·		#N/A		
Distance to edge of tov		on	0.400	km	(see Note 1 below)
Distance to sea at wors			12.000		,
Topographic Increment				(clause 3.2.3.4	. 10)
Note 1: If using the Hybrid		osest D	istance to the	e sea should b	e in the direction
being considered.					

Your address, Line 2 Your Tel & Fax No. Project Project no **CALCULATION SHEET** Job title line 1 0 Drawing no Checked by Calculation by Jan-00 Calculation sheet/revision no 0 WL3 Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A Wind Loading - Pressure Co-efficients for Overall Stability Size Effect Factors Surface Dimn a В Ca (see fig 4, Graph Line) Gable #N/A Elevation #N/A Roof #N/A 0.00 #N/A Int Vol of 1 Apt.(m³) External Pressure Coefficients - Walls Dimn to between bldgs: Building Width, W m Adjacent faces: Building Length, L m Result: #N/A Building Height, H m **Exposure Case** #N/A (see table 5) Wind @ 0 #DIV/0! D/H (*W/H*): Wind @ 90 D/H (*L/H*): #DIV/0! Cpe Values Wind at 0 Wind at 90° Zone A Surface A #DIV/0! Surfaces #N/A (see table 5 and fig 12) A & B Zone B Surface B -0.50#N/A Surfaces Zone A Zone C #N/A #N/A C & D Zone B #N/A Surface C #DIV/0! Zone C Surface D #N/A -0.50External Pressure Coefficients - Roof (assuming equal pitches) (see tables 8-11incl. and figs. 12, 20 & 21) Roof Type / Pitch Component forces (kN/m) Wind Normal to Eaves Case 1 Case 2 Horizontal Vertical Windward slope - Zone C #N/A #N/A #N/A Max #N/A Leeward slope - Zone G #N/A #N/A #N/A Min Wind Normal to Gable Zone C (Zone B if hip roof) #N/A #N/A #N/A Max #N/A #N/A #N/A Zone D (Zone E if hip roof) #N/A Min Wind Pressure For Building Stability Wind at 0° on Long Elevation Wind at 900 on short Gable #DIV/0! kN/m² (by observation stability against overturning #DIV/0! kN/m² will be critical with wind on the longest face) as cl 2.1.3.6 Wind Suction On Roof For Building Stability #N/A kN/m² For these two cases the effects of internal conditions can be ignored.

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 WL4

Wind Loading - Pressure Co-efficients for Panel Design

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Internal Pressure Coefficients

Cpi 0.2 (int pressure) Cpi x Ca: #N/A Cpi -0.3 (int suction) Cpi x Ca: #N/A

Size Effect Factor Ca taken as 1.0 for a max diagonal 'a' of 5m.

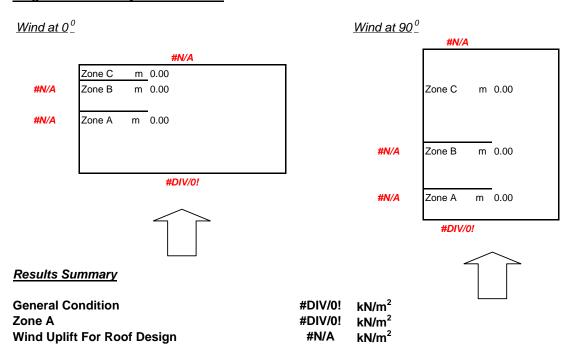
Analysis Results for Cpi + 0.2 in kN/m²

		Wind at 0 ⁰			Wind at 90 ⁰
Surface A		#DIV/0!	Surfaces	Zone A	#N/A
Surface B		#N/A	A & B	Zone B	#N/A
Surfaces	Zone A	#N/A		Zone C	#N/A
C & D	Zone B	#N/A	Surface C		#DIV/0!
	Zone C	#N/A	Surface D		#N/A

Analysis Results for Cpi - 0.3 in kN/m2

		Wind at 0 ⁰			Wind at 90 ⁰
Surface A		#DIV/0!	Surfaces	Zone A	#N/A
Surface B		#N/A	A & B	Zone B	#N/A
Surfaces	Zone A	#N/A		Zone C	#N/A
C & D	Zone B	#N/A	Surface C		#DIV/0!
	Zone C	#N/A	Surface D		#N/A

Diagramtic Summary of Wind Loads



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Summary of Design Wind Loa	ads					
For Building Stability Checks Use V	Vind Press Wind Uplif		Wind on lo #DIV/0! #N/A	ng elevation kN/m² kN/m²	Wind on short #DIV/0!	gable kN/m ²
For Panel Design Checks Use Wind	l Presssure Wind Uplif		General #DIV/0! #N/A	Condition kN/m² kN/m²	Zone A #DIV/0!	kN/m²
In order to avoid confusion on pand for all panels of:	el design u #DIV/0! #DIV/0!	se a commor kN/m² for G kN/m² for Zo	eneral cond			
Refer to overall stability sheets for app	olicable k10	0 factors.				
Site Location Map		National G	rid Reference			
				Ī		

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Wind Loading - Building Parameters

Temporary Condition - During Erection

This calculation is based upon the guidelines of BS 6399: Part 2: 1997

Dynamic Classification

Building Height 11.65 m

Building Type Factor, Kb 0.5 (Timber Framed Buildings)

Dynamic Augmentation Factor, Cr 0.011

Standard Method Calculation

Location Brighton
Basic Wind Speed,Vb 22.00 m/s (see fig. 6)
Site Altitude 87.00 m

Altitude Factor, Sa 1.09
Direction Factor, Sd 1.00
Season Factor, Ss 0.98

Season Factor, Ss 0.98 (see Annex D, cl D.2 & table D.1)
Probability Factor, Sp 0.749 (see Annex D, cl D.1)

(see table 4)

Effective Height

Reference Height, Hr
Terrain
Average Roof Top Height, Ho
Building Upwind Spacing, Xo
Effective Height, He
11.65 m
11.65 m

Effective Wind Speed

Closest Distance to Sea 55 km
Site Wind Speed, Vs 17.55 m/s
Terrain Factor, Sb 1.717

Effective Wind Speed, Ve 30.14 m/s

Dynamic Pressure 0.56 kN/m²

Your Tel & Fax No. Project Project no **CALCULATION SHEET** Job title line 1 0 Drawing no Checked by Calculation by Jan-00 Calculation sheet/revision no 0 OS₁ Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A K₁₀₀ from BS 5268-6.1:1996 **Overall Stability:** Long elevation Consider three aspects for overall stability-Short gable 1 - Sliding, 2 - Overturning and 3 - Uplift Wind on long elevation Wind on short gable kN/m² kN/m² Design Wind Load for O/A Stability: #DIV/0! #DIV/0! **General Condition** Zone A kN/m² **Design Wind Load for Stud Design:** #DIV/0! #DIV/0! kN/m² **Calcluate Total Dead Load** Loads (kN/m2) m^2 Roof Area Flat Roof 0.532 m^2 5th Floor Area Pitched Roof 1.825 m^2 4th Floor Area Compartment Floor 0.907 m^2 3rd Floor Area Intermediate Floor 0.479 2nd Floor Area m² Perimeter Wall 0.273 1st Floor Area m^2 Compartment Wall 0.418 Load-bearing Internal Wall 0.397 5th Floor Length of Int. Walls m 4th Floor Length of Int. Walls m 3rd Floor Length of Int. Walls m 5th Floor Storey Ht m 2nd Floor Length of Int. Walls 4th Floor Storey Ht m m 1st Floor Length of Int. Walls m 3rd Floor Storey Ht m Gnd Floor Length of Int. Walls 2nd Floor Storey Ht m m 1st Floor Storey Ht m 5th Floor Length of Party Walls Grnd Floor Storey Ht m m 4th Floor Length of Party Walls m 3rd Floor Length of Party Walls Note: Non-loadbearing stud walls are to be m 2nd Floor Length of Party Walls m excluded from the length of internal walls. 1st Floor Length of Party Walls m Reference to ground floor is the lowest **Gnd Floor Length of Party Walls** m level of timber frame which may not be the literal ground floor. 5th Floor Length of Ext. Walls m 4th Floor Length of Ext Walls m 3rd Floor Length of Ext Walls m 2nd Floor Length of Ext Walls m 1st Floor Length of Ext Walls m Gnd Floor Length of Ext Walls m Total Roof Load #N/A kΝ Total Floor Loads #N/A kΝ Total Int. Wall loads 0.00 kN Total Party Wall Load 0.00 kN Total Ext. Wall Load 0.00 kN #N/A **Total Dead Load** kΝ

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005© - License	d to Evaluation o	copy for Your co	mpany		#N/A	
Roof Type:	0		(this value is to h	e the same	as	
			the overall height if it is a flat roof)			
Roof Slope Length (m) #DIV/0!			(includes 0.5m ea	aves o/h)		
Overall Height (m) Top storey inset (m) Wind Forces Acting on Building (including the reduction for wind shielding)						
					(1) (2)	
		9	Use option:		(-)	
Floor Walls						
Total racking force on the width of building: #N/A kN			(Wind on Short Elevation)			
uilding:	ding: #DIV/0! kN			(Wind on Long Elevation)		
	#DIV/0!	kN				
	0.2	(with a DPC)				
	#N/A	kN				
	#N/A		#N/A #N/A	*** *********************************		
			#N/A #N/A	#N/A	###	
	#DIV/0!	kNm				
	#N/A	kNm				
	#N/A		#N/A			
	#N/A	kN/m²				
	#N/A	kN				
	#N/A	kN				
	#N/A		#N/A			
	Roof Type: Eave Roof Slope Top sto cluding the redu #N/A #DIV/0! Floor Walls ilding:	Checked by Checked by Checked by Checked by Checked by Company of the control of the contro	Checked by Checke	Checked by Checked by Date Jan-00 Calculation sheet/revises OS2 Discorption Roof Type: O Eaves Height (m) Roof Slope Length (m) Top storey inset (m) #N/A kN when building considered as a complete unit #N/A kN when building considered as an end of terrac #DIV/0! kN Floor Walls iliding: #DIV/0! kN O.2 (with a DPC) #N/A kN #N/A #N/A	CALCULATION SHEE 0 Checked by Date Jan-00 Calculation sheet/revision no OS2 Discoperation of the same the overall height if it is a flat the overall height (in it is a flat the overall height if it is a flat (includes 0.5m eaves o/h) Top storey inset (m) #N/A kN when building considered as a complete unit #N/A kN when building considered as an end of terrace unit #DIV/O! kN Use option: Floor Walls iliding: #N/A kN #DIV/O! kN 0.2 (with a DPC) #N/A kN #N/A #N/A #N/A	

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Timber Frame Engineering	y™ v3.01b 2001 - 2005© -	- Licensed to Evaluation copy for Your	r company		#N/A	
Top Storey Stabi	ility:					
For this check the val	lues are based upon	the data for the top storey heig	 ght entered abov 	/e.		
Sliding Check						
Sliding Force		#DIV/0! kN				
Co-efficient of friction	ı taken as :	0.2				
Resistance to sliding:	:	#N/A kN				
Factor of Safety again	nst sliding:	#N/A	#N/A #N/A #N/A	#N1/A	иии	
Overturning Check			#IN/A	#N/A	###	
Overturning Moment:	:	#DIV/0!				
Resistance to overturning:		#N/A				
Factor of Safety again	nst overturning:	#N/A	#N/A #N/A #N/A			
Uplift Check	Roof type:		#IN/A			
External Roof Uplift:		#N/A kN/m²				
Roof Dead Load:		#N/A kN/m ²	#N/A #N/A #N/A #N/A	#N/A		

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					• •	
Racking Resistance	e With Wind	d on Short	Elevation		BS 5268: section	6.1 (1996)
Ground floor only Wall Ref						
_ength (m)						
Height (m) (MAX 2.7m)						
Agg.area of openings (M ²)						
JDL (kN/m)						
Masonry Length (m)						
Γie Density (x/M ²)						
Basic Masonry Resistance	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Primary Board						
Material	None	None	None	None	None	None
Category						
Thickness (mm)						
Nail Diameter (mm)						
Perimeter Nail Spacing (mm) .65 dia @ 150 ONLY for plasterb'd						
Basic Racking Rest.,Rb						
(101						
(102						
K103						
Modified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Board						
Material States	None	None	None	None	None	None
Category						
hickness (mm)						
Nail Diameter (mm)						
Perimeter Nail Spacing (mm) .65 dia @ 150 ONLY for plasterb'd						
Basic Racking Rest.,Rb						
<101						
< 102						
(103						
Nodified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	0.00
(104	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
(105	#DIV/0! 0.00	#DIV/0! 0.00	0.00	#DIV/0! 0.00	#DIV/0! 0.00	0.00 اط#
(106	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
(107	#DIV/0!	#DIV/0! 1.00	ان/۱۵ #1.00	#DIV/0!	#DIV/0! 1.00	1.00 اط#
K107 K108	1.00	1.00	1.00	1.00		1.00
					1.10 #DIV/OI	
Primary	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Secondary	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Category 1 Materials	0.00	0.00	0.00	0.00	0.00	0.00
Category 2 Materials	0.00	0.00	0.00	0.00	0.00	0.00
Category 3 Materials	0.00	0.00	0.00	0.00	0.00	0.00
Masonry (<25%of P+S)	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00

0.00

Total Resistance kN

0.00

0.00

0.00

0.00

0.00

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Racking Resistance					BS 5268: section	6.1 (1996)
Wall Ref						
Length (m)						
Height (m) (MAX 2.7m)						
Agg.area of openings (M ²)						
UDL (kN/m)						
Masonry Length (m)						
Tie Density (x/M ²)						
Basic Masonry Resistance	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Primary Board						
Material	None	None	None	None	None	None
Category						
Thickness (mm)						
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						
2.65 dia @ 150 ONLY for plasterb'd						
Basic Racking Rest.,Rb						
K101						
K102						
K103						
Modified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Board						
Material	None	None	None	None	None	None
Category						
Thickness (mm)						
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						
2.65 dia @ 150 ONLY for plasterb'd						
Basic Racking Rest.,Rb						
K101						
K102						
K103					0.00	0.00
Madified Decise Db v I/m	0.00	0.00	0.00	0.00		0.00
Modified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	
						#DIV//0I
K104	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
<104 <105	#DIV/0! 0.00	#DIV/0! 0.00	#DIV/0! 0.00	#DIV/0! 0.00	#DIV/0! 0.00	0.00
K104 K105 K106	#DIV/0! 0.00 #DIV/0!	#DIV/0! 0.00 #DIV/0!	#DIV/0! 0.00 #DIV/0!	#DIV/0! 0.00 #DIV/0!	#DIV/0! 0.00 #DIV/0!	0.00 #DIV/0!
<104 <105 <106 <107	#DIV/0! 0.00 #DIV/0! 1.00	#DIV/0! 0.00 #DIV/0! 1.00	#DIV/0! 0.00 #DIV/0! 1.00	#DIV/0! 0.00 #DIV/0! 1.00	#DIV/0! 0.00 #DIV/0! 1.00	0.00 #DIV/0! 1.00
K104 K105 K106 K107 K108	#DIV/0! 0.00 #DIV/0! 1.00 1.10	#DIV/0! 0.00 #DIV/0! 1.00 1.10	#DIV/0! 0.00 #DIV/0! 1.00 1.10	#DIV/0! 0.00 #DIV/0! 1.00 1.10	#DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10
K104 K105 K106 K107 K108 Primary	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!
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K104 K105 K106 K107 K108 Primary Secondary	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!
K104 K105 K106 K107 K108 Primary Secondary	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!
K104 K105 K106 K107 K108 Primary Secondary Category 1 Materials Category 2 Materials	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00
Modified Resist., Rb x Km K104 K105 K106 K107 K108 Primary Secondary Category 1 Materials Category 2 Materials Category 3 Materials Masonry (<25%of P+S)	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!

sway frame/s each with a capacity of:

Your address, Line 2 Your Tel & Fax No. Project Project no **CALCULATION SHEET** Job title line 1 0 Drawing no Calculation by Checked by Jan-00 Calculation sheet/revision no 0 R3 Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A **Design Summary** Ground floor only Racking Resistance With Wind on Short Elevation Red. If 63mm Act. Wall Ref No. Off Cat 1 Cat 2 Cat 3 Masonry Total Stud Size kN/m 0.00 0 0.00 0.00 0.00 0.00 over 89 0.00 0 0.00 0.00 0.00 0.00 0.00 over 89 0.00 0 0.00 0.00 0.00 0.00 0.00 0.00 over 89 0.00 0 0.00 0.00 0.00 0.00 over 89 0.00 0.00 0 0.00 0.00 0.00 0.00 over 89 0.00 0.00 0 0.00 0.00 0.00 0.00 over 89 0.00 Additional values from page R7 0.00 0.00 0.00 0.00 0.00 **Total Resistances** 0.00 0.00 0.00 0.00 0.00 kN **Total Required** #N/A kΝ Proportion of Cat 3 to 1 & 2: #DIV/0! #N/A #DIV/0! CSF = #N/A #N/A If the number of storeys is greater than 4, increase the stiffness proportionally #N/A #N/A as 4 storeys is the basis of the BS 5268, Pt 6.1 relating to racking resistance. Note: This is not a code requirement. Number of Storeys 1 % reduction in resistance provided 1.00 Any shortfall is to be provided by a steel sway frames. Use sway frame/s each with a capacity of: 0.00 kN Racking Resistance With Wind on Long Elevation Red. If 63mm Act. Wall Ref No. Off Cat 1 Cat 2 Cat 3 Masonry Total Stud Size kN/m 0.00 0.00 0 0.00 0.000.00 over 89 0.00 0 0.00 0.00 0.00 0.00 0.00 over 89 0.00 0.00 0.00 0 0.00 0.00 0.00 over 89 0.00 0.00 0.00 0 0.00 0.00 0.00 over 89 0.00 0 0.00 0.00 0.00 0.00 0.00 over 89 0.00 0.00 0 0.00 0.00 0.00 0.00 over 89 0.00 Additional values from page R7 0.00 0.00 0.00 0.00 **Total Resistances** 0.00 0.00 0.00 0.00 0.00 kN **Total Required** #DIV/0! kΝ Proportion of Cat 3 to 1 & 2: #DIV/0! #DIV/0! #DIV/0! CSF = #DIV/0! #DIV/0! #DIV/0! #DIV/0! If the number of storeys is greater than 4, increase the stiffness proportionally as 4 storeys is the basis of the BS 5268, Pt 6.1 relating to racking resistance. Note: This is not a code requirement. Number of Storeys 1 % reduction in resistance provided 1.00 Any shortfall is to be provided by a steel sway frames. Use

0.00 kN

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#N/A

Racking Resistance In the Temporary Condition Ground floor only

Consider the racking resistance of the building in the temporary condition before the plasterboard is fixed, and contributes to the overall resistance. If resistance is inadequte provision of temporary bracing will be required.

In order to establish the temporary racking resistance, only cat 1 materials will be mobilised. The racking forces causing the disturbing effects will be based upon a pro rata of temporary wind load to design wind load and multiplied by the long term resistance required.

Design Wind Pressure: 1.03 kN/m² Temporary Wind Pressure: 0.56 kN/m²

So Temporary Resistance to be: 53.88% of Design Resistance.

Racking Resistance With Wind on Short Elevation

Design Resistance Required: #N/A kΝ Temporary Resistance Required: #N/A kΝ Temporary Resistance Provided: 0.00 kN

Therefore: #N/A

Racking Resistance With Wind on Long Elevation

Design Resistance Required: #DIV/0! kΝ Temporary Resistance Required: #DIV/0! kΝ Temporary Resistance Provided: 0.00 kN

Therefore: #DIV/0!

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Additional			•		. ,	
Racking Resistance	e With Wind	l on Short	Elevation		BS 5268: section	6.1 (1996)
Ground floor only						, ,
Wall Ref						
Length (m)						
Height (m) (MAX 2.7m)						
Agg.area of openings (M ²)						
UDL (kN/m)						
Masonry Length (m)						
Tie Density (x/M²)						
Basic Masonry Resistance	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Primary Board						
Material	None	None	None	None	None	None
Category						
Γhickness (mm)						
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						
2.65 dia @ 150 ONLY for plasterb'd						
Basic Racking Rest.,Rb						
K101						
K102						
K103						
Modified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Board						
Material	None	None	None	None	None	None
Category						
Thickness (mm)						
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						
2.65 dia @ 150 ONLY for plasterb'd						
Basic Racking Rest.,Rb						
K101						
K102						
K103						
Modified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	0.00
<104	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0! 0.00	#DIV/0! 0.00	#DIV/0! 0.00	#DIV/0! 0.00	#DIV/0! 0.00	#DIV/0! 0.00
< 105						
<105 <106	0.00	0.00	0.00	0.00	0.00	0.00
K105 K106 K107	0.00 #DIV/0!	0.00 #DIV/0!	0.00 #DIV/0!	0.00 #DIV/0!	0.00 #DIV/0!	0.00 #DIV/0!
<105 <106 <107 <108	0.00 #DIV/0! 1.00	0.00 #DIV/0! 1.00	0.00 #DIV/0! 1.00	0.00 #DIV/0! 1.00	0.00 #DIV/0! 1.00	0.00 #DIV/0! 1.00
K105 K106 K107 K108 Primary	0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10
K105 K106 K107 K108 Primary Secondary	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!
K105 K106 K107 K108 Primary Secondary	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!
K105 K106 K107 K108 Primary Secondary Category 1 Materials	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!
K105 K106 K107 K108 Primary Secondary Category 1 Materials Category 2 Materials	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!
K104 K105 K106 K107 K108 Primary Secondary Category 1 Materials Category 2 Materials Category 3 Materials Masonry (<25%of P+S)	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00

Total Resistance kN

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Project		P	roject no	C	CALCULATIO	ON SHEET
Job title line 1		C)			
Drawing no	Calculation by	C	hecked by	D	ate	
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					R6	
Timber Frame Engineering™ v	/3.01b 2001 - 200	5© - Licensed t	o Evaluation co	oy for Your com	pany	
Additional						
Racking Resistance	e With Wind	d on Long	Elevation	E	3S 5268: section	6.1 (1996)
Ground floor only Vall Ref						
ength (m)						
Height (m) (MAX 2.7m)						
Agg.area of openings (M ²)						
JDL (kN/m)						
, ,						
Masonry Length (m)						
Fie Density (x/M²)	4214	415.75	#P://	#b:/a	45.75	45146
Basic Masonry Resistance	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Primary Board						
Material Page 1	None	None	None	None	None	None
Category						
hickness (mm)						
lail Diameter (mm)						
Perimeter Nail Spacing (mm)						
.65 dia @ 150 ONLY for plasterb'd						
Basic Racking Rest.,Rb						
(101						
(102						
(103						
Modified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Board						
Material	None	None	None	None	None	None
Category	None	None	None	None	None	None
hickness (mm)						
Nail Diameter (mm)						
Perimeter Nail Spacing (mm) .65 dia @ 150 ONLY for plasterb'd						
•						
Basic Racking Rest.,Rb						
(101						
(102						
(103						
Modified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	0.00
(104		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
(105	#DIV/0!	#010/0!	, • .			#DIV/0!
	#DIV/0! 0.00	#DIV/0! 0.00	0.00	0.00	0.00	#DIV/0! 0.00
106				0.00 #DIV/0!	0.00 #DIV/0!	
(106 (107	0.00 #DIV/0!	0.00 #DIV/0!	0.00 #DIV/0!	#DIV/0!		0.00 #DIV/0!
107	0.00 #DIV/0! 1.00	0.00 #DIV/0! 1.00	0.00 #DIV/0! 1.00	#DIV/0! 1.00	#DIV/0! 1.00	0.00 #DIV/0! 1.00
1107 1108	0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10	#DIV/0! 1.00 1.10	#DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10
:107 :108 [?] rimary	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!	#DIV/0! 1.00 1.10 #DIV/0!	#DIV/0! 1.00 1.10 #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0!
107 108 rimary	0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10	#DIV/0! 1.00 1.10	#DIV/0! 1.00 1.10	0.00 #DIV/0! 1.00 1.10
107 108 rimary econdary	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!
107 108 rimary econdary	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!
2107 2108 Primary Secondary Category 1 Materials Category 2 Materials	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00	#DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00	#DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00 0.00	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0! 0.00
1107 (108 Irimary Secondary	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	#DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!

Your address, Line 2 Your Tel & Fax No.

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				•		Jan-00	
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imber Frame Er	ngineering™ \	⁄3.01b 2001 - 20	005© - License	d to Evaluation	copy for Your co	mpany	#1
Additional Ground floo Racking Resi	r only	_	ort Flevation	,			
							Red. If 63mm A
Wall Ref	No. Off	<u>Cat 1</u>	Cat 2	Cat 3	<u>Masonry</u>	<u>Total</u>	Stud Size kN
0		0.00	0.00	0.00	0.00	0.00	over 89 0
0		0.00	0.00	0.00	0.00	0.00	over 89 0
0		0.00	0.00	0.00	0.00	0.00	over 89 0
0		0.00	0.00	0.00	0.00	0.00	over 89 0
0		0.00	0.00	0.00	0.00	0.00	over 89 0
0		0.00	0.00	0.00	0.00	0.00	over 89 0
Total Re	esistances values carri	0.00 ed to main su	^{0.00} ummary page	0.00			
Total Re							
Total Re	values carri	ed to main su	ummary page				
Total Re	values carri	ed to main su	ummary page		Masonry	Total	Red. If 63mm A
Total Re v Racking Resi <u>Wall Ref</u>	values carri	ed to main su n Wind on Lo <u>Cat 1</u>	immary page ing Elevation <u>Cat 2</u>	<u>Cat 3</u>	Masonry 0.00	<u>Total</u>	Stud Size kN
Total Re	values carri	n Wind on Lo <u>Cat 1</u> 0.00	ing Elevation <u>Cat 2</u> 0.00	<u>Cat 3</u> 0.00	0.00	0.00	Stud Size kN over 89 0
Total Re v Racking Resi <u>Wall Ref</u>	values carri	ed to main su n Wind on Lo <u>Cat 1</u>	immary page ing Elevation <u>Cat 2</u>	<u>Cat 3</u>		·	Stud Size kN
Total Re	values carri	n Wind on Lo Cat 1 0.00 0.00	ing Elevation Cat 2 0.00 0.00	Cat 3 0.00 0.00	0.00	0.00	Stud Size kN over 89 0 over 89 0
Racking Resi	values carri	n Wind on Lo Cat 1 0.00 0.00 0.00	ing Elevation Cat 2 0.00 0.00 0.00	Cat 3 0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	Stud Size kN over 89 0 over 89 0 over 89 0
Racking Resi	values carri	n Wind on Lo Cat 1 0.00 0.00 0.00 0.00	eng Elevation Cat 2 0.00 0.00 0.00 0.00	Cat 3 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	Stud Size kN over 89 0 over 89 0 over 89 0 over 89 0
Racking Resi	values carri	Cat 1 0.00 0.00 0.00 0.00 0.00	eng Elevation Cat 2 0.00 0.00 0.00 0.00 0.00	Cat 3 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	Stud Size kN over 89 0 over 89 0

Project		P	roject no		CALCULATION	Your Tel & Fa.
•			•	,	ALCULATION	ON SHEET
Job title line 1		C)			
Drawing no	Calculation by	C	hecked by	Di	ate	
	•			-	Jan-00 alculation sheet/revis	ion no
	0			O.	R5	NOTI TIO
Timber Frame Engineering™	v3.01b 2001 - 2005	5© - Licensed t	o Evaluation cop	oy for Your comp	pany	
Racking Resistanc	e With Wind	d on Short	Elevation	В	3S 5268: section	6.1 (1996)
Wall Ref						
_ength (m)						
Height (m) (MAX 2.7m)						
Agg.area of openings (M ²)						
JDL (kN/m)						
Masonry Length (m)						
Γie Density (x/M²)						
Basic Masonry Resistance	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Primary Board						
Material Page 1	None	None	None	None	None	None
Category						
hickness (mm)						
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						
.65 dia @ 150 ONLY for plasterb'd						
.65 dia @ 150 ONLY for plasterb'd Basic Racking Rest.,Rb						
.65 dia @ 150 ONLY for plasterb'd Basic Racking Rest.,Rb (101						
.65 dia @ 150 ONLY for plasterb'd Basic Racking Rest.,Rb K101 K102						
.65 dia @ 150 ONLY for plasterb'd Basic Racking Rest.,Rb (101 (102 (103	0.00	0.00	0.00	0.00	0.00	0.00
.65 dia @ 150 ONLY for plasterb'd Basic Racking Rest.,Rb K101 K102 K103 Modified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	0.00
Basic Racking Rest.,Rb (101 (102 (103 Modified Resist., Rb x Km Becondary Board	0.00 None	0.00 None	0.00 None	0.00 None	0.00 None	0.00 None
Rest., Rb x Km Rescondary Board Rest.						
.65 dia @ 150 ONLY for plasterb'd Basic Racking Rest.,Rb (101 (102 (103 Modified Resist., Rb x Km Becondary Board Material Category						
Aderial Category Thickness (mm) Assic Racking Rest., Rb Assic Racking Rest., Rc Assic Racking Rest., R						
2.65 dia @ 150 ONLY for plasterb'd Basic Racking Rest.,Rb K101 K102 K103 Modified Resist., Rb x Km Becondary Board Material Category Thickness (mm) Perimeter Nail Spacing (mm)						
Perimeter Nail Spacing (mm) 1.65 dia @ 150 ONLY for plasterb'd Basic Racking Rest., Rb 1.61 (102 1.61 (103 1.65 dia @ 150 ONLY for plasterb'd Basic Racking Rest., Rb 1.65 dia @ 150 ONLY for plasterb'd						
Action of the control						
Cassic Racking Rest.,Rb						
Basic Racking Rest.,Rb K101 K102 K103 Modified Resist., Rb x Km Becondary Board Material Category Thickness (mm) Nail Diameter (mm) Perimeter Nail Spacing (mm) L65 dia @ 150 ONLY for plasterb'd Basic Racking Rest.,Rb K101 K102						
Basic Racking Rest.,Rb C101 C102 C103 Modified Resist., Rb x Km Becondary Board Material Category Thickness (mm) Nail Diameter (mm) Perimeter Nail Spacing (mm) C5 dia @ 150 ONLY for plasterb'd Basic Racking Rest.,Rb C101 C102 C103	None	None	None	None	None	None
Basic Racking Rest.,Rb x Km Basic Racking Rest.,Rb						
Basic Racking Rest.,Rb K101 K102 K103 Modified Resist., Rb x Km Becondary Board Material Category Thickness (mm) Jail Diameter (mm) Perimeter Nail Spacing (mm) Basic Racking Rest.,Rb K101 K102 K103 Modified Resist.,Rb K101 K102 K103 Modified Resist., Rb x Km	None 0.00	None 0.00	None	None 0.00	None 0.00	None
Assic Racking Rest., Rb x Km Assecondary Board Asterial Category Thickness (mm) Asil Diameter (mm) Perimeter Nail Spacing (mm) Assic Racking Rest., Rb	0.00 #DIV/0!	0.00 #DIV/0!	0.00 #DIV/0!	0.00 #DIV/0!	0.00 #DIV/0!	0.00 #DIV/0!
2.65 dia @ 150 ONLY for plasterb'd 2.63 dia @ 150 ONLY for plasterb'd 2.63 dia @ 150 ONLY for plasterb'd 2.64 dia @ 150 ONLY for plasterb'd 2.65 dia @ 150 ONLY for plasterb'd 2.65 dia @ 150 ONLY for plasterb'd 2.65 dia @ 150 ONLY for plasterb'd 3.65 dia @ 150 ONLY for plasterb'd	0.00 #DIV/0! 0.00	0.00 #DIV/0! 0.00	0.00 #DIV/0! 0.00	0.00 #DIV/0! 0.00	0.00 #DIV/0! 0.00	0.00 #DIV/0! 0.00
Action of the control	0.00 #DIV/0! 0.00 #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0!
des dia @ 150 ONLY for plasterb'd desic Racking Rest.,Rb (101 (102 (103 Modified Resist., Rb x Km (104 (105 (103 Modified Resist.))) der meter Nail Spacing (mm) (105 dia @ 150 ONLY for plasterb'd desic Racking Rest.,Rb (101 (103 Modified Resist., Rb x Km (104 (105 (106 (107 (107 (107 (107 (107 (107 (107 (107	0.00 #DIV/0! 0.00 #DIV/0! 1.00	0.00 #DIV/0! 0.00 #DIV/0! 1.00	0.00 #DIV/0! 0.00 #DIV/0! 1.00	0.00 #DIV/0! 0.00 #DIV/0! 1.00	0.00 #DIV/0! 0.00 #DIV/0! 1.00	0.00 #DIV/0! 0.00 #DIV/0! 1.00
des dia @ 150 ONLY for plasterb'd desic Racking Rest.,Rb (101 (102 (103 Modified Resist., Rb x Km decondary Board Material Category (Phickness (mm) deside @ 150 ONLY for plasterb'd desic Racking Rest.,Rb (101 (102 (103 Modified Resist., Rb x Km decondary Board (104 (105 (105 (105 (105 (105 (105 (105 (105	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10
asic Racking Rest.,Rb x Km accondary Board atterial attegory hickness (mm) asid Diameter (mm) asic Racking Rest.,Rb	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10
asic Racking Rest.,Rb x Km accondary Board atterial attegory hickness (mm) asid Diameter (mm) asic Racking Rest.,Rb	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10
Assic Racking Rest., Rb Addified Resist., Rb x Km Acterial Category Chickness (mm) Asil Diameter (mm) Perimeter Nail Spacing (mm) Asic Racking Rest., Rb Addified Resist., Rb x Km Addified Resist., Rb x Km Addified Resist., Rb Addified Resis	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!
Assic Racking Rest., Rb Another Rest., Rb Another Rest., Rb Another Resist., Rb x Km Another Resist., Rb Another Resist., Rb Another Resist., Rb Another Resist., Rb x Km	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!
Category 1 Materials Category 2 Materials Category 2 Materials Category 2 Materials Category 2 Materials Category 4 Materials Category 6 Material 6 Material 7 Material 8 Material 9 Mail Diameter (mm) 9 Mail Diameter (mm) 9 Mail Diameter Nail Spacing (mm) 1 Mail 0 Material 9 Mater	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! 0.00 0.00	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!
Basic Racking Rest.,Rb K101 K102 K103 Modified Resist., Rb x Km Becondary Board Material Category Thickness (mm) Nail Diameter (mm) Perimeter Nail Spacing (mm) K5 dia @ 150 ONLY for plasterb'd Basic Racking Rest.,Rb K101 K102 K103 Modified Resist., Rb x Km	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!	0.00 #DIV/0! 0.00 #DIV/0! 1.00 1.10 #DIV/0! #DIV/0!

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Project		P	roject no		CALCULATION	Your Tel & Fa
Job title line 1		()			
Drawing no	Calculation by	C	hecked by	[Date	
	0			(Jan-00 Calculation sheet/revis	sion no
	U				R6	
Timber Frame Engineering™ v	3.01b 2001 - 200	5© - Licensed	o Evaluation co	py for Your com	npany	
Racking Resistance					BS 5268: section	n 6.1 (1996)
Wall Ref						
Length (m)						
Height (m) (MAX 2.7m)						
Agg.area of openings (M ²)						
JDL (kN/m)						
Masonry Length (m)						
Γie Density (x/M²)						
Basic Masonry Resistance	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Primary Board						
Material	None	None	None	None	None	None
Category	Hone	None	140110	140110	None	140110
Thickness (mm)						
Nail Diameter (mm)						
Perimeter Nail Spacing (mm)						
2.65 dia @ 150 ONLY for plasterb'd						
Basic Racking Rest.,Rb						
<101 <4.00						
<102						
K103	0.00	0.00			0.00	0.00
Modified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Board						
Material	None	None	None	None	None	None
Category						
Thickness (mm)						
Nail Diameter (mm)						
Perimeter Nail Spacing (mm) 2.65 dia @ 150 ONLY for plasterb'd						
·						
Basic Racking Rest.,Rb						
K101						
K102						
K103	2.22	2.22				0.00
Modified Resist., Rb x Km	0.00	0.00	0.00	0.00	0.00	0.00
K104	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
< 105	0.00	0.00	0.00	0.00	0.00	0.00
K106	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
< 107	1.00	1.00	1.00	1.00	1.00	1.00
< 108	1.10	1.10	1.10	1.10	1.10	1.10
Primary	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Secondary	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Category 1 Materials	0.00	0.00	0.00	0.00	0.00	0.00
Category 2 Materials	0.00	0.00	0.00	0.00	0.00	0.00
Category 3 Materials	0.00	0.00	0.00	0.00	0.00	0.00
* .						
Masonry (<25%of P+S)	0.00	0.00	0.00	0.00	0.00	0.00

0.00

Total Resistance kN

0.00

0.00

0.00

0.00

0.00

Project Project no CALCULATION SHEET

Job title line 1

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		Calculation by		Checked by		Date Jan-00		
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mber Frame Eng	gineering™ v3	3.01b 2001 - 2009	5© - Licensed	to Evaluation	copy for Your cor	mpany		#N/
Design Sur								
i irst floor and Racking Resis		Wind on Sho	rt Elevation					
Wall Ref	No. Off	Cat 1	Cat 2	Cat 3	Masonry	Total	Red. If 63mm Stud Size	Act kN/r
0		0.00	0.00	0.00	0.00	0.00	over 89	0.0
0		0.00	0.00	0.00	0.00	0.00	over 89	0.0
0		0.00	0.00	0.00	0.00	0.00	over 89	0.0
0		0.00	0.00	0.00	0.00	0.00	over 89	0.0
0		0.00	0.00	0.00	0.00	0.00	over 89	0.0
0		0.00	0.00	0.00	0.00	0.00	over 89	0.0
Total Re	sistances	0.00	0.00	0.00	0.00	0.0	00 kN	
	Required					#N/A	kN	
	Proportion of	Cat 3 to 1 & 2:	#DIV/0!			Adequate Re	neietanen	
	1 Toportion of	Cat 5 to 1 & 2.	#DIV/0:	#DIV/0	!	CSF =	#N/A	
							#N/A	
he number of st	toreys is greate	er than 4, increas	e the stiffness	proportionally				
1 starava is the								
4 Storeys is the	basis of the B	S 5268, Pt 6.1 re	elating to racking	ng resistance.				
-			elating to rackir	_	umber of Storeys	1		
-			-	Nu	umber of Storeys istance provided	1 1.00		
-			-	Nu	•			
ote: This is not	a code requir	rement.	% г	Nu	•			
ote: This is not	a code requir		% г	Nu	•		Red. If 63mm	Act.
ote: This is not	a code requir	rement.	% г	Nu	istance provided		Red. If 63mm Stud Size	
nte: This is not	a code requir	wind on Long	% r	Nueduction in res	•			kN/n
ote: This is not acking Resis	a code requir	wind on Long	% r g Elevation <u>Cat 2</u>	Nu eduction in res	istance provided Masonry	1.00	Stud Size	<u>kN/n</u> 0.0
nte: This is not acking Resis	a code requir	Wind on Long Cat 1 0.00	% r g Elevation <u>Cat 2</u> 0.00	Nueduction in res	Masonry 0.00	0.00	Stud Size	0.0 0.0
ecking Resis	a code requir	Wind on Long Cat 1 0.00 0.00	% r. g Elevation Cat 2 0.00 0.00	Nueduction in res	Masonry 0.00 0.00	0.00 0.00	Stud Size over 89	0.0 0.0 0.0
acking Resis	a code requir	Wind on Long Cat 1 0.00 0.00 0.00	% r % r g Elevation Cat 2 0.00 0.00 0.00	Cat 3 0.00 0.00 0.00	Masonry 0.00 0.00 0.00	0.00 0.00 0.00	Stud Size over 89 over 89	0.0 0.0 0.0 0.0
te: This is not acking Resis Vall Ref 0 0 0	a code requir	Wind on Long Cat 1 0.00 0.00 0.00 0.00	% r % r ### Second Representation ### Cat 2 0.00	Cat 3 0.00 0.00 0.00 0.00	Masonry 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	Stud Size over 89 over 89 over 89	kN/n 0.0 0.0 0.0 0.0 0.0
acking Resis	a code requir	Cat 1 0.00 0.00 0.00 0.00 0.00 0.00	% r. ### Section of Cat 2 ### Output ##	Cat 3 0.00 0.00 0.00 0.00 0.00 0.00	Masonry 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	Stud Size over 89 over 89 over 89 over 89 over 89	0.00 0.00 0.00 0.00 0.00
acking Resis Wall Ref 0 0 0 0 Total Re	a code requir	Cat 1 0.00 0.00 0.00 0.00 0.00	% r g Elevation Cat 2 0.00 0.00 0.00 0.00 0.00 0.00	Cat 3 0.00 0.00 0.00 0.00 0.00	Masonry 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	Stud Size over 89 over 89 over 89	kN/n 0.0 0.0 0.0 0.0 0.0
acking Resis Wall Ref 0 0 0 0 Total Re	a code requirestance With No. Off sistances Required	Cat 1 0.00 0.00 0.00 0.00 0.00 0.00 0.00	% r % r 2 Elevation Cat 2 0.00 0.00 0.00 0.00 0.00 0.00 0.00	Cat 3 0.00 0.00 0.00 0.00 0.00 0.00	Masonry 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 #DIV/0!	Stud Size over 89 over 89 over 89 over 89 over 89	kN/n 0.0 0.0 0.0 0.0 0.0
acking Resis Wall Ref 0 0 0 0 0 Total Re	a code requirestance With No. Off sistances Required	Cat 1 0.00 0.00 0.00 0.00 0.00 0.00	% r. ### Section of Cat 2 ### Output ##	Cat 3 0.00 0.00 0.00 0.00 0.00 0.00	Masonry 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 #DIV/0!	Stud Size over 89 over 89 over 89 over 89 over 89	0.00 0.00 0.00 0.00 0.00
acking Resis Wall Ref 0 0 0 0 0 Total Re	a code requirestance With No. Off sistances Required	Cat 1 0.00 0.00 0.00 0.00 0.00 0.00 0.00	% r % r 2 Elevation Cat 2 0.00 0.00 0.00 0.00 0.00 0.00 0.00	Cat 3 0.00 0.00 0.00 0.00 0.00 0.00	Masonry 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 #DIV/0!	Stud Size over 89 over 89 over 89 over 89 over 89	kN/n 0.0 0.0 0.0 0.0 0.0
acking Resis Wall Ref 0 0 0 0 Total Re Total	stance With No. Off sistances Required Proportion of	Cat 1 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Cat 3 to 1 & 2:	% rows and the stiffness % rows are stiffness % rows and state of the stiffness % rows are st	Cat 3 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	Masonry 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 #DIV/0!	Stud Size over 89 over 89 over 89 over 89 over 89 kN kN	0.00 0.00 0.00 0.00 0.00
Packing Resis Wall Ref 0 0 0 0 Total Ref Total	sistances Required Proportion of	Cat 1 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Cat 3 to 1 & 2:	% rows and the stiffness % rows are stiffness % rows and state of the stiffness % rows are st	Cat 3 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Proportionally or resistance.	Masonry 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 #DIV/0! #DIV/0! CSF =	Stud Size over 89 over 89 over 89 over 89 over 89 kN kN	Act. kN/m 0.00 0.00 0.00 0.00 0.00
Racking Resis Wall Ref 0 0 0 0 Total Ref Total	sistances Required Proportion of	Cat 1 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Cat 3 to 1 & 2:	% row	Cat 3 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	Masonry 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 #DIV/0! #DIV/0! CSF =	Stud Size over 89 over 89 over 89 over 89 over 89 kN kN	0.00 0.00 0.00 0.00 0.00
Racking Resis Wall Ref 0 0 0 0 Total Ret Total	sistances Required Proportion of	Cat 1 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Cat 3 to 1 & 2:	% row	Cat 3 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	Masonry 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 #DIV/0! #DIV/0! CSF =	Stud Size over 89 over 89 over 89 over 89 over 89 kN kN	0.00 0.00 0.00 0.00 0.00

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Calculation sheet/revision no

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Racking Resistance In the Temporary Condition First floor and above

Consider the racking resistance of the building in the temporary condition before the plasterboard is fixed, and contributes to the overall resistance. If resistance is inadequte provision of temporary bracing will be required.

In order to establish the temporary racking resistance, only cat 1 materials will be mobilised. The racking forces causing the disturbing effects will be based upon a pro rata of temporary wind load to design wind load and multiplied by the long term resistance required.

Design Wind Pressure: 1.03 kN/m²
Temporary Wind Pressure: 0.56 kN/m²

So Temporary Resistance to be: 53.88% of Design Resistance.

Racking Resistance With Wind on Short Elevation

Design Resistance Required: 0.00 kN
Temporary Resistance Required: 0.00 kN
Temporary Resistance Provided: 0.00 kN

Therefore: Temporary Bracing Is Required

Racking Resistance With Wind on Long Elevation

Design Resistance Required: #DIV/0! kN Temporary Resistance Provided: #DIV/0! kN Temporary Resistance Provided: 0.00 kN

Therefore: #DIV/0!

Your Tel & Fax No. Project Project no **CALCULATION SHEET** 0 Job title line 1 Drawing no Calculation by Checked by Date Jan-00 Calculation sheet/revision no 0 S 1 Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A Stud Design For Wall Reference: 0 **Wall Panel Details** Floor Level: G Super load reduction: (BS 6399:Pt1:1996) Total no.of storeys: No. of floors qualifying for load red.: Reduction for Fire Resistance Indices -1 (BS 5268 Pt 4: Section 4.2, cl 6.2.2) Allowable % Reduction This Floor: #N/A 0 Stud Height 0 mm #N/A Stud Width 38 mm #N/A Depth 89 mm Centres 600 mm 0.00 m Span 1: Type: 0 Span 2: 0.00 m Type: 0 Floor joist span condition: Single span 0.00 m Floor to Floor Height: 0.00 Wall Type: Wind Condition: Zone A Self Weight of Wall: #N/A KN/m2 UDL from Self weight: #N/A KN/m **Applied Wind Load:** KN/m2 #N/A Dead Load of Supported Const'n on span 1: 0.00 KN/m2 Total Load of Supported Const'n on span 1: 0.00 KN/m2 Dead Load of Supported Const'n on span 2: 0.00 KN/m2 Total Load of Supported Const'n on span 2: 0.00 KN/m2 Dead UDL From Above: 0.00 kN/m 0.00 kN/m (before SL red.) Total UDL From Above: Dead Load: #N/A kN/m Super Load: #N/A kN/m (unmodified) Total (before SL red.): #N/A kN/m Total (after SL red.): #N/A kN/m Stud Dead Load: #N/A kΝ Stud Total Load: (after SL red if reqd) #N/A kΝ #N/A kNm **Stud Wind Moment:** Results #N/A OK in bending - LT 0.00 Consider 'p delta' effects: No Stud Grade: C16 Wind load Deflection: 0.98 mm Panel Rail Grade: **C16** 'Out of Plumb' Limit: 15.00 mm Increased Bending Moment: 0.000 kNm **Deflection Values** Actual Limits Masonry Check **Elastic Deflection** #N/A mm 0.00 mm % wind carried by masonry #N/A Trada Method #N/A #N/A mm 0.00 mm Masonry Check Swedish Method #### #N/A 0.00 mm Masonry Utilisation mm

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Stud Des	ign Summ	nary							
Ground Floo	or Walls								
Wall Ref	Calc Page	Dead kN/m	Total kN/m	Stud Width	Stud Depth	Centres	Fire Ratio	CSI	

Your Tel & Fax No. Project Project no **CALCULATION SHEET** Job title line 1 0.00 Drawing no Calculation by Checked by Date Jan-00 Calculation sheet/revision no 0.00 DS 2 Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A **Stud Design Summary** First Floor Walls Wall Ref Calc Page Dead kN/m Total kN/m Stud Width Stud Depth Centres Fire Ratio CSI

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Second Floo	or vvails							
Wall Ref	Calc Page	Dead kN/m	Total kN/m	Stud Width	Stud Depth	Centres	Fire Ratio	CSI

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Your Tel & Fax No. Project Project no **CALCULATION SHEET** Job title line 1 0.00 Drawing no Calculation by Checked by Date Jan-00 Calculation sheet/revision no 0.00 DS 5 Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A **Stud Design Summary** Fourth Floor Walls Wall Ref Calc Page Dead kN/m Total kN/m Stud Width Stud Depth Centres Fire Ratio CSI

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Timber Frame	Engineering™	v3.01b 2001 - 2	2005© - Licen	sed to Evaluatio	on copy for You	r company		#N/A
Stud Des	ign Sumn	nary						
Fifth Floor V	Valls							
Wall Ref	Calc Page	Dead kN/m	Total kN/m	Stud Width	Stud Depth	Centres	Fire Ratio	CSI

Your Tel & Fax No. Project Project no **CALCULATION SHEET** Job title line 1 0.00 Drawing no Calculation by Checked by Date Jan-00 Calculation sheet/revision no 0.00 DS 7 Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A **Stud Design Summary** Sixth Floor Walls Wall Ref Calc Page Dead kN/m Total kN/m Stud Width Stud Depth Centres Fire Ratio CSI

Your address, Line 1 Your address, Line 2 Your Tel & Fax No.

Project				Project no		CALCULA	TION SHEE	
Job title line	e 1			0				
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Timber Frame	Engineering™	v3.01b 2001 -	2005© - Licer	nsed to Evaluation	on copy for You	r company		#N/A
						_		
	Cripp	ie Stud Des	_	d Reference: cal Load only)	1	0		
Panel Deta	ils		(7010	our Loud only)				
Opening W	idth	0	mm (if applie	cable)	Reduction for	or Fire Resis	stance Indic	ces
Floor Level		0			(BS 5268 Pt 4	Section 4.2, c	l 6.2.2)	
	Beam Ref 1:			Beam Ref 2:			No	
Beam Read			Beam Rea		0	1	•	
	tud Centres		mm	Supporting	Cripple Stud	Ref:	0	
Cripple Stu	ua Heignt I by sheathii	2400	mm No	(nloctoub court	l :		bina mataria	η.
Stud	width		mm	(piasterboard	l is not an appı	Consider a	-	-
Otaa	depth	7.7	mm			element	No.	aring
nun	nber of studs		No.			#N/A		
Nailed so a	as to act as	1 member:	No					
Wall Type:	0.00	1	Floor joists o	continuous ov	er int. walls:	No)	
	From Above) kN (including				
Total Load	From Above:		0.00) kN (including	point loads)			
Dead Load	This Floor:		0.00) kN/m				
Total Load				kN/m				
Stud Dead	Load:		0.000) kN				
Stud Total			0.000) kN				
Stud Wind			#N/ <i>A</i>	A kNm				
Results	OK in comp		0.00		#N/A		#N/A	
C16	OK in comp p		0.00		#N/A	l	#N/A	
	OK in comp p	oerm loads	0.00		OK in comp p	•	0.00	
#N/A	#N/A		#N/A		FAILS Slende	erness ratio	1.03	
Stud Grade	e:	C16						
Panel Rail		C16						
Full Heigh	t (Opening o	r Kina Stud)	Stud Dosia	n				
	ral Load only)		Stud grade					
,	· · · · · · · · · · · · · · · · · · ·	ı	J					
Applied Wir		#N/A	kN/m ²	Stud Height		mm		
Bending Mo	oment:	#N/A	kNm					
AI.	umbar of feet	l haiakt at	ام بمصنابه ا	. #\$1/A	No (Minim	 	aalama la farr	
N	umber of full	neight stud	is required:	: #N/A	No. (Minimum	1		
						point load sup	port only)	
Deflection Va	alues							
		Actual		Limits				
Deflection Va	ction	Actual #N/A #N/A	mm mm		mm			

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					CDS	1			
Timber Frame	Engineering™	v3.01b 2001 - 2	2005© - Licer	sed to Evaluation	on copy for You	r company		#N/ <i>A</i>	
Cripple S	Stud Desig	n Summa	ry						
Ground Flo	or Walls								
						No. of Studs			
Stud Ref	Calc Page	Dead kN	Total kN	Stud Width	Stud Depth	CS/FH	Grade	CSI	

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Project				Project no		CALCULATI	ON SHEE	Т
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Cripple S	Stud Desig	n Summa	ry					
First Floor V	Walls							
						No. of Studs		
Stud Ref	Calc Page	Dead kN	Total kN	Stud Width	Stud Depth	CS/FH	Grade	CSI

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Cripple S	tud Desigi	n Summa	ry					
Second Floo	or Walls					No. of Studs		
Stud Ref	Calc Page	Dead kN	Total kN	Stud Width	Stud Denth	CS/FH	Grade	CSI

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Cripple S	Stud Desig	n Summa	ry					
Third Floor	Walls					No of Child		
Stud Ref	Calc Page	Dead kN	Total kN	Stud Width	Stud Depth	No. of Studs CS/FH	Grade	CSI

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Timber Frame	Engineering™	v3.01b 2001 - 2	2005© - Licer	nsed to Evaluation	on copy for You	r company		#N/A
Cripple S	tud Desig	n Summa	ry					
Fourth Floor	r Walls					No. of Studs		
Stud Ref	Calc Page	Dead kN	Total kN	Stud Width	Stud Denth	CS/FH	Grade	CSI

Project				Project no		CALCULATI	ON SHEE	Т
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• •	Stud Design	Summai	у					
Fifth Floor V	Valls					No. of Studs		
Stud Rof	Calc Page	Doad kN	Total kN	Stud Width	Stud Denth	CS/FH	Grade	CSI

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Cripple S	Stud Desigr	ı Summaı	ry					
Sixth Floor	Walls							
						No. of Studs		
Stud Rof	Calc Page	Doad kN	Total kN	Stud Width	Stud Denth	CS/FH	Grade	CSI

Project			Project no		CALCULATI	Your Tel & Fax No.
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Timber Frame Engineering™	v3.01b 2001 - 20	005© - Licens	sed to Evaluation	n copy for You	r company	#N/A
Solid Rectangular Floo	r loiete			Ref:	1	
Solid Rectaligular Floo	1 301515			Location:		
Span (m): 0.00	Cant (m):	0.00	Joist c/c	0	mm	
Floor Type: 0	0.07.	2		allowance:		$0.27~kN/m^2$
Floor Loading Total Span Point Load: Dead:	0.27 k 0.00 k		Dead 0.00	0.27 kN from lhs	kN/m ² 0.00	m
Cantilever Point load:	Dead:	0.00		0.00		111
Bending Moments: UDL	#DIV/0!					
Consider section:	Width C		Grade:		Depth/Bread	th Ratio: ###
	Depth C)	EI GA	#N/A #N/A	N/mm ² x10 ⁹ Nx10 ⁶	
Applied bending stress	#DIV/0! N	V/mm²	GA	#11/74	INX TO	
Load duration factor, K3	1	1.00			Natural Freq	uency
Load sharing factor, K8		1.10				#N/A Hz
Depth factor, K7	1	1.17			(Minimum to BS	6 6399 Pt 1:8.4Hz)
Basic bending stress		#N/A	N/mm ²			
Admissible bending stres	SS		N/mm ²		#DIV/0!	
Check bearing of joist.		Reaction:	#DIV/0!	kN (End)		
5	•					
Bearing width: Bearing length:	_	mm mm				
Bearing stress applied:	#DIV/0! N					
0 11						
Comp perp to grain:	#N/A N	V/mm ²	Factor, K ₄ :	#N/A		
Admissible comp perp to Admissible comp perp to			N/mm ² on jo N/mm ² (C16 I		#DIV/0! #DIV/0!	
Admissible comp perp to	grain	#11/7	N/IIIII (C161	neadbindeij	#DIV/0:	
Check Deflection (udl &	pl, simply supp	ported)				
	Total	Total	Imposed	Imposed		
Elastic Deflection (mm)	Span (Max) (#DIV/0!	Cant (Max) #N/A	Span (<i>Max</i>) #DIV/0!	Cant (Max) #N/A		
Shear Deflection (mm)	#DIV/0!	#N/A	#DIV/0!	#N/A		
Total Deflection (mm)	#DIV/0!	#N/A	#DIV/0!	#N/A		
Allowable area deflection			indicates uplift		#DIV//OI	
Allowable span deflectio Allowable total cant defle	•	,	0.00		#DIV/0!	
/ mowable total barn done	JOHOTT (Max 1211	11111 01 12 100)	0.00			
Check Shear Stress (wit	h notches if ar	ny)	Top Notch D	-		mm
Reaction from UDL	#DI///OF I	∠NI	Dimn 'a' (Fig 2			mm mm
NEACTION HOMEODE	#DIV/0! k	VI N	Bottom Noto	прерш		mm
			Uplift case:			
Actual Shear Stress	#DIV/0! N		#DIV/0!	kN		Depth to deep
Adm. Shear Stress	#N/A N	N/mm²			#DIV/0!	

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Timber Frame Engineering™	v3.01b 2001 - :	2005© - Licen	sed to Evaluatio			#N/A
				.,		
I Beam Floor Joists - S	Single Span	with or without	cantilever)	Ref:	1.5	
0 4 (.) 0 00	0 - 1 (-1)	0.00	1.1.1.1.1.	Location:		
Span 1 (m): 0.00	Cant (m):	0.00	Joist c/c:	_	mm	0.27 1.81/2
Floor Type: 0 Floor Loading Total:	0.27	kN/m²		allowance:	kN/m ²	0.27 kN/m ²
Floor Loading Total: Point Load:	0.27		Dead: Point Load:		kN/m kN from lhs	0.00 m
Cantilever Point loads:	Dead:			0.00		0.00 111
Bending Moments: UDL		kNm PL	#N/A		KIN	
Consider I Beam Ref:			#14//	KINIII		
Properties Service Class		М		Max End	Max Internal	No. of joists if
Mmt Capacity EI		Flange Width	GA	Reaction	Reaction	used as trimmer
kNm N/mm ² x10 ⁹	kN	mm	Nx10 ⁶	kN	kN	No.
3.57 285.00	3.77	45	1.140	4.18	7.85	1
Load duration factor, K3	}	1.00				
Load sharing factor, K8		1.04	(Masonite 1.05	/ TJI ? / BCI, L	PI, JJI & FJI 1.	04,Nordic 1.07)
Adjustment for Service (Class 2	1.00	(Use a factor of	f 0.8 if class 2 v	alues reqd for	Mas / TJI
Admissible bending mor	ment	3.71	kNm		LPI are class 2	2)
					#N/A	
Check Bearing Reaction	-	DL Reaction:		kN (End)	#N/A	
		PL Reaction:	#N/A	kN		
Bearing width:	_	mm				
Bearing length:	-	mm				
Reaction applied:	#N/A	KIN			Min End Do	aviant anath EAU (
Comp porn to grain	2.20	N/ 2/04	N. I I. D I.	,	IVIIN End Be	aring Length FAIL!
Comp perp to grain: Factor, K ₄	2.20 #N/A		Head Binde	r)		
Admissible comp perp to			N/mm ²	End	#N/A	
Admissible comb bein it	o grain	#11/74	N/mm	Ellu	#IN/A	
Check Deflections	Total	Total	Imposed	Imposed		
OHOOK DOHOOLOHO	Span (Max)		Span (Max)	Cant (Max)		
Elastic Deflection (mm)	#N/A	#N/A	#N/A	#N/A	Natural Free	quency
Shear Deflection (mm)	#N/A	#N/A	#N/A	#N/A	Tratarar 1 10	#N/A Hz
Total Deflection (mm)	#N/A	#N/A	#N/A	#N/A	(Minimum to E	3S 6399 Pt 1:8.4Hz)
rotal Bolloction (mm)			indicates uplift		(, , , , , , , , , , , , , , , , , , , ,
Allowable total span def	lection (min 12			mm	#N/A	
Allowable imposed spar	•	•	0.00	mm	#N/A	
Allowable total cant defl			0	mm		
Allowable imposed cant			0.00	mm		
01 1 61 5					(12.11.	
Check Shear Capacity			1.1-1:4		#N/A	
D			Uplift case:	1.81		Pet
Reaction from UDL	#N/A		#N/A	KIN	Support cor	naition:
Reaction from PL	0.00	KIN			Rim beam	n Oanlan Dif
Adminaikla Dasatian	2.00	LNI				r Series Ref:
Admissible Reaction	3.92	KIN			User to sel	
					wiin support	width (mm): ###

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Timbor Frame Engineering	VO.010 2001	LIGOTI	ood to Evaluatio	11 00py 101 1 0u	Company	711477
I Beam Floor Joists - 2	/ 3 Span:	2 span des	ign	Ref:		
Cnon 4 (m): 0.00	Cn an 2 (m)	0.00	laiat a/a.	Location:	•	
Span 1 (m): 0.00 Floor Type: 0	Span 2 (m):	0.00	Joist c/c:	υ :allowance	mm Basic	0.27 kN/m^2
Floor Loading Total:	0.27	kN/m ²	Dead:		kN/m ²	0.27 KN/III
Point Load:	0.00		Point Load:		kN from pin end	0.00 m
Bending Moments: UDL	0.00	kNm PL	#N/A	kNm	Load in span:	0
Consider I Beam Ref:	E II 45 - 240	ldn				
Properties Service Class		up		Max End	Max Internal	No. of joists if
Mmt Capacity EI	Shear Cap'ty	Flange Width	GA	Reaction	Reaction	used as trimmer
kNm N/mm ² x10 ⁹	kN	mm	Nx10 ⁶	kN	kN	No.
4.60 470.00	4.77	45	1.500	4.18	8.29 I	1
Load duration factor, K3		1.00				
Load sharing factor, K8		1.04	(Masonite 1.05	5 / TJI ? / BCI, L	ı .PI, JJI & FJI 1.0	04,Nordic 1.07)
Adjustment for Service C		1.00		f 0.8 if class 2 v	values reqd for	
Admissible bending mon	nent	4.78	kNm		LPI are class 2	2)
					#IN/A	
Check Bearing Reaction	of joist. UI	DL Reaction:	0.00	kN (End)	#N/A	
	F	PL Reaction:	#N/A	kN	Int Reaction	O.K.
Bearing width:		mm	Deering les	بام مسمع منا طعم		
Bearing length end: End reaction applied:	#N/A	mm kN	-	igth internal: nal reaction:		mm kN
End rodollon applied.	111171	NI V	inton	na roadion.		aring Length FAIL
Comp perp to grain:		N/mm ² (C16	head binder	r basic)	Min Int Bea	ring Length FAILS
Factor, K ₄	#N/A	#N1/A	N1/ 2	Fnd	#NI/A	
Admissible comp perp to	grain	#IN/A	N/mm ²		#N/A #DIV/0!	
Check Deflection						
	Spa		Span		Spar	
	Total	Total	Imposed	Imposed	Total	Imposed
Elastic Deflection (mm)	UDL #DIV/0!	PL #N/A	UDL #N/A	PL 0.00	0.00	#N/A
Shear Deflection (mm)	0.00	#N/A	#N/A	#N/A	0.00	#N/A
Total Deflection (mm)	#DIV/0!	#N/A	#N/A	#N/A	0.00	#N/A
All and the fortill of the control		1 (000)	Span 1	Span 2	#DIV/0!	
Allowable total deflection Allowable imposed defle			0.00 0.00	0.00 0.00	#N/A Fails in Defl	ection - span 2
Allowable imposed delic	Clion (L/+00)	_	0.00	0.00	#N/A	ection - Span 2
Check Shear Capacity					Shear O.K.	
Described (1951						Pet
Reaction from UDL Reaction from PL	0.00 0.00				Support cor Rim beam	ndition:
NEAUIUH HUIH FL	0.00	M				r Series Ref:
Admissible Reaction	4.96	kN			User to sel	

Cantilever

#N/A kN

#N/A #N/A

Span

#N/A kN

Reaction from UDL

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Joist Design Summary	L							
Decian Data						Unfootor	and Cupport	Calc
Design Data Joist Ref Section / Profile	Centres	Span 1	Span 2 /	Deflection	ons (mm)	Unfactored Support Reactions (kN)		page no.
Cooler Tollio	(mm)	Opan i	Cantilever	Total	Imposed	End	Internal	
	, ,							

Your Tel & Fax No. Project Project no **CALCULATION SHEET** Job title line 1 0 Drawing no Calculation by Checked by Date Jan-00 Calculation sheet/revision no 0 SBD 1 Timber Frame Engineering $^{™}$ v3.01b 2001 - 2005 $^{\circledcirc}$ - Licensed to Evaluation copy for Your company #N/A #N/A Steel Beam Design Ref: 1 Span (m): m No. off Location: #N/A Point Load Details Reactions (kN): Reference Dead (kN) Live (kN) Position (m) LHS RHS Ser PL 1 #N/A #N/A #N/A #N/A #N/A #N/A D PL 2 #N/A #N/A #N/A #N/A #N/A #N/A PL 3 #N/A #N/A #N/A #N/A #N/A #N/A Total Uniform Load Details #N/A #N/A Ult Reference Span (m) Dead (kN/m) Live (kN/m) UDL 1 #N/A #N/A #N/A #N/A Conservative ultimate UDL 2 #N/A #N/A #N/A #N/A bending moment based UDL 3 #N/A #N/A #N/A on all point loads acting (inc. swt) Floor joists continuous over beam: No indiviually and then summated. **Ultimate Bending Moment:** #N/A kNm Enter bending moment if a more accuarate analysis has been made: kNm Enter max shear force if a more accuarate analysis has been made: kΝ Maximum length of unrestrained section: #N/A m Effective length factor for the unrestrained length: 1.20 **Beam Section Used:** Grade: S275 Beam Properties: Wt #N/A kg/m Limits: L/x Limit Value:(mm) **Deflection Check:** D #N/A mm Live: #N/A 480 #N/A #N/A В #N/A mm #N/A Total: #N/A 360 #N/A #N/A t mm #N/A Limit for Masonry support (mm): 5 Т #N/A mm **Shear Capacity Check:** lxx #N/A cm4 Maximum Shear Force: #N/A kN #N/A cm4 Ivv Pvx = 0.6 pyA: #N/A kN #N/A rxx cm #N/A **Utilisation Ratio:** #N/A #N/A ryy ст Zxx #N/A ст3 **Bending Moment Check:** Zyy #N/A ст3 #N/A kNm Maximum Bending Moment: Sxx #N/A cm3 Moment Capacity is min of (1.2pyZx) or (pySx) #N/A kNm Syy #N/A ст3 #N/A cm2 Buckling Moment Capacity (Simplified approach to BS 5950 cl 4.3.7) #N/A П Effective Length of Unrestrained section: #N/A #N/A m Х Bending Strength (Calculated as per Clause B2): #N/A N/mm² D/T #N/A Buckling RM is min of (pbZx) or (pbSx) λ or Le/ry #N/A λLT #N/A Buckling Resistance Moment Mb: #N/A kNm #N/A **Cripple Stud Requirements** C16 Panel rail grade: Stud size (w x d): Adm Comp p to g on bottom rail: 2.2 N/mm² Minimum bearing length: #N/A mm #N/A x studs

Project				Project no		CALCULAT	Your Tel & I	Fax No.
Job title	line 1			0				
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Timber F	rame Engineering [⊤]	v3.01b 2001 -	2005© - Licen:	sed to Evaluati	ion copy for You	r company		#N/A
Timber	Beam Design	Ref:	1.00	Span (m) Location		m		
Point L	oad Details					Reactio	ns (kN):	
	Reference	Position (m)	Dead (kN)	Live (kN)		LHS	RHS	Ser
PL 1	#N/A	#N/A #N/A	#N/A #N/A	#N/A		#N/A	#N/A	D
PL 2 PL 3	#N/A #N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A		#N/A #N/A	#N/A #N/A	l Total
FLS	#11//	#11/7	#19/75	#11/71		#N/A	#N/A	W
Uniform	Load Details					#N/A	#N/A	Max
	Reference	Span (m)	Dead (kN/m)	Live (kN/m)	Wind (kN/m)			
UDL 1	#N/A	#N/A	#N/A	#N/A	#N/A	Conservative u	ltimate	
UDL 2	#N/A	#N/A	#N/A	#N/A	#N/A	bending mome		
UDL 3	#N/A	-	#N/A	#N/A	(inc. swt)	on all point load	-	
	Floor Jois	sts continuous		No Num Rondi	ng Moment:	indiviually and t	tnen summati kNm	ea.
Enter b	ending moment	if a more acc			•	_	kNm	
	nax shear force						kN	
Consid	ler design as a	trimmer:	No				Properties:	
Roam S	Section Used:	1 / 2/0 × 00		Grado	: Kerto S LV	D Total B	240 90	mm mm
Dealli C	bection osea.	1 / 240 X 90		Glulam		No. of Timbers	1	111111
Deflect	ion Check:	Limits: L/x	Limit Value:		110	Axis of bending		O & B):
Live:	#N/A	480	#N/A	#N/A			X-X	
Total:	#N/A	333	#N/A	#N/A				
						K ₃	1.00	. ,
	Capacity Checlor Im Shear Force		#N/A	LNI		Wt	11.02 10368.00	kg/m
	hear Stress	•		N/mm ²		Ixx Zxx	864.00	cm4 cm3
	near Stress			N/mm ²		A	216.00	cm2
	ım Shear Stress	S:	#N/A	N/mm ²				
						#N/A		
	g Moment Che							
	ım Applied Bend	ding Moment:			kNm			
	ending stress:				7 N/mm ²			
	ending stress: ım Adm. Bendin	a Moment:) N/mm² 2 kNm	#N/A		
Maximi	im Aum. Benum	ig Moment.		17.02	2 KINIII	#IN/A		
Minimu	ım Bearing Ler	ngth:						
	ım reaction:		#N/A	kN				
	omp p to g on u/	s beam:		N/mm ²				
Beam v		h:		mm or	#N1/A	No. 38mm s	tude	
wiifiifiu	m bearing lengt	н.	#N/A	mm or	#IN/A	INO. SOITHI ST	เนนธ	
Panel ra	ail grade:	C16	Stud	size (w x d)	: 38	89		
Adm Co	omp p to g on bo		2.20	N/mm ²				
Minimu	m bearing lengt	h:	#N/A	mm or	#N/A	38 x 89 stud	S	

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Timber F	rame Engineering [⊤]	··· V3.01b 2001 - 2	2005© - Licen	seu to Evalua	tion copy for You	Company		#N/A
Flitch I	Beam Design	Ref:	1.00	Span (m Location		m		
Point L	oad Details					Reaction	ons (kN):	
	Reference	Position (m)	Dead (kN)	Live (kN)		LHS	RHS	Ser
PL 1	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	D
PL 2	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	I
PL 3	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	Total
						#N/A	#N/A	W
Uniforn	n Load Details					#N/A	#N/A	Max
	Reference	Span (m)	Dead (kN/m)	Live (kN/m				
UDL 1	#N/A	#N/A	#N/A	#N/A	#N/A	Conservative u		
UDL 2	#N/A	#N/A	#N/A	#N/A	#N/A	bending mome		
UDL 3	#N/A Floor ioi	- ete continuoue	#N/A	#N/A N	(inc. swt)	on all point loa indiviually and	•	tod
	Floor Jois	sts continuous			ing Moment:	#N/A	kNm	iea.
Enter h	ending moment	if a more acci			•	#IN/A	kNm	
	nax shear force						kN	
Lintoi	lax offical force	ii a moro acco	arato ariaryo	10 1100 0001	rinado.	Beam Propert		
Beam 9	Section Used:	3 / 245 x 44 -	+ 2 / 220 x 1	2 m.s. plat	es	Steel 220	Timber 245	mm
Timber	Grade:	C16			В	12	44	mm
	Olado.	0.10			No. of Plys		3	
Deflect	tion Check:	Limits: L/x	Limit Value:		,	Wt	57.94	kg/m
Live:	#N/A	480	#N/A	#N/A				
Total:	#N/A	333	#N/A	#N/A				
	ng stress in tim		#N/A	N/mm ²	#N/A			
Bendin	ng stress in ste	el:	#N/A	N/mm ²	#N/A			
	51mm diameter 36mm timber, a							
Permis	sible load per	bolt:	9.4	kN				
	ansfer to plate:		#N/A		Use bolts at	#N/A	mm c/c	
	oolts required at	the support:	#N/A	No. bolts				
	um Bearing Lei	ngth:	#N/A	kN				
Adm C	omp p to g on u	/s beam:	2.2	N/mm ²				
Beam v				mm				
Minimu	m bearing lengt	h:	#N/A	mm o	r #N/A	No. 38mm s	tuds	
Panel r	ail grade:	C16	Stud	size (w x d): 38	89		
	omp p to g on b			N/mm ²				
	m bearing lengt		#N/A	mm o	r #N/A	38 x 89 stud	ls	

Your Tel & Fax No. Project Project no **CALCULATION SHEET** Job title line 1 0.00 Drawing no Calculation by Checked by Date Jan-00 0.00 Calculation sheet/revision no TBDS 1 Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A **Trimmer Beam Design Summary** Calc Design Data Unfactored Reactions in k page Grade / No. Of LHS D Beam Ref Span (m) LHS I RHS D RHS I Section & kg/m Approximate tonnage of steelwork on this schedule: 0.00 Tonnes

Your address, Line 1 Your address, Line 2 Your Tel & Fax No.

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Job title line	1			0				
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Steel Post D	<u> Design</u>	Ref:	1	Ht (m): Eff Length:		m		
Floor Level :			#N/A					
Is super load Total no.of st		required:	No 2					
No.of floors		or load red.:	#N/A					
Nett Allowab			0%					
Loading (Ur	nfactored P	Point loads kN)				Connections at	: 100mm from	ı face
	PL 1 x-x	PL 3 x-x	PL 2 y-y	PL 4 y-y	From Above	Moment x-x	Moment y-y	/
Dead	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
Imposed _ Total	#N/A #N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A	
TOtal	#IN/A	#IN/A	#IN/A	#IN/A	#IN/A	#IV/A	#IN/A	
Column Sec	tion Used	: 152 x 152 x	23 UC	Grade:	S275	Colui	mn Propertie	es:
		•	oilty if noted ?)	#N/A	1	Wt	23.00	kg/m
	ads: (after S	Super Load Redu		le)		D	152.40	mm
Mmt x-x:		#N/A				В	152.20	mm
Mmt y-y:		#N/A				t T	5.80	mm
Vertical Dead Le Vertical Impose		#N/A #N/A				lxx	6.80 1250.00	mm cm4
vertical impose	u Loau.	#11/7	NIN			lyy	400.00	cm4
Check colum	nn to Claus	e 4.7.7 BS 59	50 Part 1			rxx	6.54	ст
						ryy	3.70	ст
Fc:	#N/A	kN	Pc:	#N/A		Zxx	164.00	ст3
Mx:	#N/A	kNm	Mbs:	#N/A		Zyy	52.60	ст3
My:	#N/A	kNm	pyZy:	14.47		Sxx	182.00	ст3
						Syy	80.20	ст3
U	nity Factor	: #N/A		#N/A		Α	29.20	cm2
						u	0.00	
Baseplate T	o Timber S	Soleplate Des	sign:			X	0.00	
		7.00	N/0					
Max comp points $Max w = cpg$		10.50	N/mm2					
Baseplate Si			mm sa (F d	lanatas affeat l	baseplate, with	 ctiff \		
Pyp:		5 N/mm2	Act w:		N/mm2		Sections Onl	lv
Minimum Th			mm				22.41	,
					ļ	ו Lambda or Le/ry	#N/A	
						Lambda LT		
Cap Plate:	Use same	as baseplate.						
-		-						
						1		

Your Tel & Fax No. Project Project no **CALCULATION SHEET** Job title line 1 0 Drawing no Calculation by Checked by Date Jan-00 Calculation sheet/revision no 0 SPDS 1 Timber Frame Engineering™ v3.01b 2001 - 2005© - Licensed to Evaluation copy for Your company #N/A **Steel Post Design Summary** Cap plate & Cap plate & Design Data Baseplate Baseplate Unfactored Loads (kN) $Thk \; (\mathsf{mm} \;)$ Post Ref Size (mm x mm) CSI Section Height (m) Grade Dead Imposed 0.00

Your Tel & Fax No.

Project No CALCULATION SHEET

Job title line 1 0

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Connection Designs Involving Hot Rolled Members

Note: Unless specified otherwise the minimum bolt pitch and centres is to comply with the requirements of BS 5950 Part 1:2000, cl 6.2

Shear Capacity = Ps = ps.As cl. 6.3.2.1 ps: 375 N/mm²
Tensile Capacity = Pnom = 0.8pt.At cl. 6.3.4.2 pt: 560 N/mm²
Bearing Cap Bolt: = Pbb = dtppbb cl 6.3.3.2 pbb: 1000 pbb: 1000 N/mm²
Scombined Shear & Tension: refer to cl 6.3.4.4

For the purposes of these calculations At = An. M12 8.8 mm^2 mm^2

kbs = 1.0 for standard clearnce holes.

All connections to be connected using M20 Grade 8.8 bolts.

Hot Rolled Connection Ultimate Single Shear Capacities (kN)

Values can be doubled for "Double Shear".

	Bolt Diameter				
No. of Bolts	M12	M16	M20		
1	31.61	58.88	91.88		
2	63.23	117.75	183.75		
3	94.84	176.63	275.63		
4	126.45	235.50	367.50		

M20 Grade 8.8 Bolts Bearing Capacities govern for plate thickness 6mm to 9mm and then shear governs 10mm and over.

Hot Rolled Connection Ultimate Bearing Capacities (kN): 1.4dmin e <= 2d

(28-40) 50 mm

		e:	50	mm				
		Minimum Thickness of Material						
No. of Bolts	6.00	7.00	8.00	9.00	10.00	12.50	15.00	İ
1	69.00	80.50	92.00	103.50	115.00	143.75	172.50	İ
2	138.00	161.00	184.00	207.00	230.00	287.50	345.00	İ
3	207.00	241.50	276.00	310.50	345.00	431.25	517.50	İ
4	276.00	322.00	368.00	414.00	460.00	575.00	690.00	ĺ

Hot Rolled Connection Ultimate Bearing Capacities (kN): e > 2d

(e = loaded end distance & d = bolt diameter)

					(0 - 100000	ia aiotarioo a a	- boil didiffoloi	,
Ī			Minimum Thickness of Material					
	No. of Bolts	6.00	7.00	8.00	9.00	10.00	12.50	15.00
Ī	1	55.20	64.40	73.60	82.80	92.00	115.00	138.00
	2	110.40	128.80	147.20	165.60	184.00	230.00	276.00
	3	165.60	193.20	220.80	248.40	276.00	345.00	414.00
	4	220.80	257.60	294.40	331.20	368.00	460.00	552.00

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Connection Capacities

Based on the foregoing calculations the following connection capacities can be achieved.

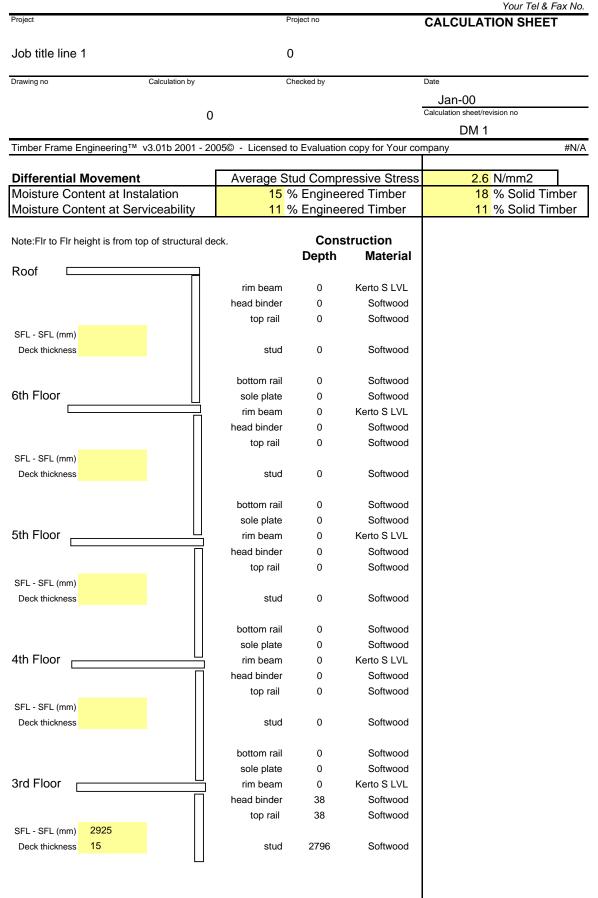
Hot Rolled Connection Capacities Using M20 Grade 8.8 bolts (kN): e > 2d

(e = loaded end distance & d = bolt diameter)

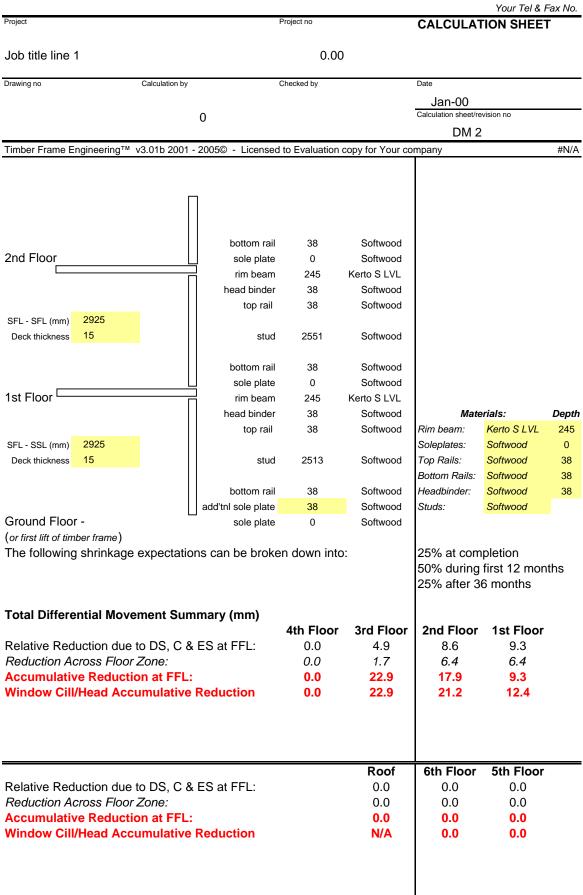
				(0 - 1000000	ia aistarioc a a	- bolt didiffictor,	,
	Minimum Thickness of Material						
No. of Bolts	6.00	7.00	8.00	9.00	10.00	12.50	15.00
1	55.20	64.40	73.60	82.80	91.88	91.88	91.88
2	110.40	128.80	147.20	165.60	183.75	183.75	183.75
3	165.60	193.20	220.80	248.40	275.63	275.63	275.63
4	220.80	257.60	294.40	331.20	367.50	367.50	367.50

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Connection	n Desig	n Summ	<u>nary</u>		(Plate de	epths take	n as 0.9 x	κ'd' and al	 welds to 	be f/w - siz	e as plt	thk)
Design Data		Left	Hand Co	nnection				Rig	। ht Hand (Connection		
Beam Ref	То	Ult Force	Туре	Thk/Weld	Bolt	No. of	То	Ult Force	туре	Thk/Weld	Bolt	No. of
	CRS/HRS	kN	Fin/End	mm	Size	Bolts	CRS/HRS	kN	Fin/End	mm	Size	Bolts

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Disproportionate Collapse Philosophy

In considering Disproportionate Collapse the limit of collapse is 15% of the gross total floor area per level or 70m² whichever is the lesser.

For this project the floor areas are:

1st Floor	0 m^2
2nd Floor	0 m^2
3rd Floor	0 m^2
4th Floor	0 m^2
5th Floor	0 m^2
Roof	0 m^2

15% of limiting area

ng are
m^2
m^2
m^2
m^2
m^2
m^2

Design Philosophy

In designing timber framed buildings the assumptions noted below are made, and the purpose of these calculations is to demonstrate, where applicable, that these assumptions are adequate in the event of a collapse.

- Disproportianate Collapse checks are carried out on the principal of notional removing panels - one at a time - between return walls or defined key elements
- 2. Continuous walls constructed with category 1 or 2 sheathing have inherent strength likely to be capable of supporting their own weight by virtue of arching or acting as a deep beam. A panel action calculation can provide evidence for this.
- 3. Assuming that the walls above can support their own weight (and span to points of support) rim beams support the weight of the floor and 30% imposed loads on that floor.
- 4. Key elements, where required, typically posts or columns, are to be designed to withstand a horizontal force, in any direction, of 34kN/m² on the width of the element.

Generally 5 conditions of rim beam design occur. Consider,

- 1. External wall supporting max span of floor,
- 2. External wall with only wall self weight and nominal floor,
- 3. Party wall supporting max span of floor,
- 4. Party wall with only wall self weight and nominal floor,
- 5. Internal wall supporting worst case floor spans.

Key element post designs are generally only required to demonstrate a maximum capacity to be checked against applied loading.

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Disproportionate Collapse Calculations

Design of Key Element Post.

2.60 m Height of post Thickness of post 140 mm Width of post 90 mm

Glulam size if applicable

Material Glulam GL28C C27 45 x 250

Basic Adm. Bending Stress (Min) 14.18 N/mm² Basic Adm. Compressive Stress 7.55 N/mm² 12669 mm³ E_{min} K_3 2.0

Total Vertical Load in Post 75 kN Horizontal 'Event' Load 34 kN/m²

Bending Moment 2.59 kNm

8.79 N/mm² Act. Bending Stress 5.95 N/mm² Act. Compressive Stress

30.85 N/mm² Permissible Bending Stress 10.49 N/mm² Permissible Compressive Stress

Allowable bending + axial ratio 0.90 < 1

Horizonatal Reaction at head / base of post

3.98 kN

Horizontal reaction is to be transferred at floor and ceiling level.

See Bracket detail

Post Adequate

In the majority of cases where key element posts are used, it can be demonstrated that they are adequate under normal load conditions, they will also satisfy the collapse condition. The reduction in super load offsets the effects of the horizontal notional force.

It is usual for the post to be a minimum of 89mm deep and to be in one piece and not 2 x 45mm pieces.

The calculation above shows the relationship between vertical load and width of post. Providing this relationship is maintained there is no need to provide further calculations.

The horizontal reaction developed as a result of alternative post widths is covered on calc page DC10.

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Rim Beam Design - Condition 1 - Ext	ernal wall su	oporting max	span of floo	 <u> </u>	
Depth of rim beam	240				
Width of rim beam (total)	45				
No.of Timbers	1		Glulam size if a	applicable	
Material	Kerto Q			Panel Ht:	2.4 m
Basic Adm. Bending Stress (Min)	13.53				
Basic Adm. Compressive Stress	11.10			Max distance	between
K_3	2.0			<i>appropriate</i> r	eturn walls:
Maximum Bending Capacity:	11.69	kNm.			3.2 m
Max span of rim beam at collapse col	ndition:	3.20	m (Based on	the minimum of dis	tance between
Max span of floor on beam at collaps	e:	3.50	m	return walls.)	
Floor joist spans: (single or double):		Double			
Effective span of floor on beam at col	llapse:	2.89	m		
Floor dead load at collapse			kN/m²		
30% imposed load at collapse		0.50	kN/m ²		
Wall load (if any) carried on rim beam	:	1.50	kN/m		
(normally max 1 storey a	s detail abov	e will repeat.	.)		
Maximum UDL on rim beam is therfor	re:	3.38	kN/m		
Maximum bending moment in bear	n:	4.32	kNm	Section Adec	uate
Maximum Reaction:		5.40	kN		•
The reaction needs adequate suppor	t in the event	of a collapse	e.		
By observation an 89 x 38 stud will ca		-			
conditions, therefore by applying a Ka					
under collapse conditions. If 2 studs a	•	•			
36kN can be achieved.		,			
If the rim beam supporting the great	ater load (us	ually the on	e supportin	g	
the floor joists) at a panel junction	takes prece	dence over	the lighter	ſ	
loaded beam then this will ensure	that there is	always 2 st	uds below.		
Wall panels are always to be lappe	d in the opp	osite manne	er to the		
rim beams.					
If no walls are present below rim b		_	ers		
off adjacent rim beams. Typically 0	Cullen Multi	Hangers.		See page DC	
				intersection de	etails.
Elastic Deflection Check					
Modulus Of Elasticity (min)	8360	N/mm ²			
G (min)		N/mm ²			
- ()	.10	. 4/111111			
Elastic Deflection	10.6	mm			
Shear Deflection		mm			
Total Deflection	11.6	mm			
Limiting Deflection @ L/30	106.7	mm		Deflection O.	K.
Liming Deliconori & Liou	100.7			Defication 0.	

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Rim Beam Design - Condition 2 - Ex	ternal wall wit	h only wall self weight a	I nd nominal floor 	
Depth of rim beam	241			
Width of rim beam (total)	45			
No.of Timbers	1	Glulam size if	<u> </u>	
Material	Kerto Q		Panel Ht:	2.4 m
Dania Adua Dandina Otasaa (Min)	40.50			
Basic Adm. Bending Stress (Min) Basic Adm. Compressive Stress	13.53 11.10		Max distance betw	100n
K ₃	2.0		<u>appropriate</u> return	
Maximum Bending Capacity:	_	kNm.	appropriate Tetun	3.5 m
Max span of rim beam at collapse co	_		the minimum of distance	
Max span of floor on beam at collaps		0.40 m	return walls.)	201110011
Floor joist spans: (single or double):		Single	ŕ	
Effective span of floor on beam at co	llapse:	0.40 m		
Floor dead load at collapse		1.14 kN/m ²		
30% imposed load at collapse		0.50 kN/m ²		
Wall load (if any) carried on rim beam	n:	0.00 kN/m		
(normally max 1 storey a	as detail abov	re will repeat.)		
Maximum UDL on rim beam is therfo	νro.	0.33 kN/m		
Maximum bending moment in bea		0.50 kNm	Section Adequate	e
Maximum Reaction:		0.57 kN	Coonsider	
The reaction needs adequate support	rt in the event	of a collapse.		
By observation an 89 x 38 stud will o				
conditions, therefore by applying a K				
under collapse conditions. If 2 studs	are provided	at each junction then		
36kN can be achieved.				
If the rim beam supporting the gre the floor joists) at a panel junction			ng 	
loaded beam then this will ensure	•	•		
Wall panels are always to be lappe		-		
rim beams.	ж пт пто орр			
If no walls are present below rim b	eam end. pr	ovide hangers		
off adjacent rim beams. Typically		_	See page DC 9 for	r typical
, , ,		J	intersection details	• •
Elastic Deflection Check				
		2		
Modulus Of Elasticity (min)		N/mm ²		
G (min)	418	N/mm ²		
Elastic Deflection	1 5	mm		
Shear Deflection		mm		
Total Deflection		mm		
	1.0			
Limiting Deflection @ L/30	116.7	mm	Deflection O.K.	

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Rim Beam Design - Condition 3 - Par	ty wall suppo	orting max sp	an of floor		
Depth of rim beam	240				
Width of rim beam (total)	45				
No.of Timbers	1		Glulam size if	i'	
Material	Kerto Q			Panel Ht:	2.4 m
Basic Adm. Bending Stress (Min)	13.53				
Basic Adm. Compressive Stress	11.10			Max distance be	etween
K ₃	2.0			appropriate ret	
Maximum Bending Capacity:	11.69	kNm.			5.6 m
Max span of rim beam at collapse col	ndition:	5.40	m (Based on	the minimum of dista	nce between
Max span of floor on beam at collapse	e:	4.00		return walls or 2.25	x panel height.)
Floor joist spans: (single or double):		Double			
Effective span of floor on beam at col	lapse:	3.30			
Floor dead load at collapse			kN/m ²		
30% imposed load at collapse			kN/m ²		
Wall load (if any) carried on rim beam: (normally max 1 storey a			kN/m)		
(nonnany man r eteroy e	io dotaii door	o IIII Topoaii	.,		
Maximum UDL on rim beam is therfor		3.65	kN/m		
Maximum bending moment in bear	n:	13.29		Section Inaded	juate!
Maximum Reaction:		9.84	kN		
The reaction needs adequate support	t in the event	of a collapse	9.		
By observation an 89 x 38 stud will ca		•			
conditions, therefore by applying a K ₃	of 2.0 a stud	will carry 18	BkN		
under collapse conditions. If 2 studs a	are provided	at each junct	ion then		
36kN can be achieved.					
If the rim beam supporting the great	-	-		ng	
the floor joists) at a panel junction	•		•		
loaded beam then this will ensure to		•			
Wall panels are always to be lappe	a in the opp	osite manne	er to tne		
rim beams. If no walls are present below rim be	oam and ne	ovide hance	re		
off adjacent rim beams. Typically C	_	_	ii 3	See page DC 9	for typical
c dajacom min bodino. Typicany C	- anon muni	gora.		intersection deta	
					-
Elastic Deflection Check					
Modulus Of Elasticity (min)	8360	N/mm ²			
G (min)		N/mm ²			
Flority Bufford	22 :				
Elastic Deflection	93.1				
Shear Deflection	_	mm			
Total Deflection	96.1	111111			
Limiting Deflection @ L/30	180.0	mm		Deflection O.K	
				1	

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Rim Beam Design - Condition 4 - Pal	rty wall with or	nly wall self	weight and r	oominal floor
Depth of rim beam	250			
Width of rim beam (total)	45			
No.of Timbers	2		Glulam size if	i'
Material GI	ulam GL28C	C27	45 x 250	Panel Ht: 2.5 m
Basic Adm. Bending Stress (Min)	14.18			
Basic Adm. Compressive Stress	7.55			Max distance between
K_3	2.0			appropriate return walls:
Maximum Bending Capacity:	14.63	kNm.		5 m
Max span of rim beam at collapse co		5.00	m (Based on	the minimum of distance between
Max span of floor on beam at collaps	e:	0.40		return walls or 2.25 x panel height.)
Floor joist spans: (single or double):		Single		
Effective span of floor on beam at co	llapse:	0.40		
Floor dead load at collapse			kN/m ²	
30% imposed load at collapse Wall load (<i>if any</i>) carried on rim beam			kN/m ² kN/m	
(normally max 1 storey a				
(normally max i storey t	do dotan abov	o wiii ropout	• /	
Maximum UDL on rim beam is therfo	re:	0.47	kN/m	
Maximum bending moment in bear	m:	1.46	kNm	Section Adequate
Maximum Reaction:		1.17	kN	
The reaction peeds adequate suppor	t in the event	of a collapse	2	
The reaction needs adequate suppor By observation an 89 x 38 stud will c		-		
conditions, therefore by applying a K				
under collapse conditions. If 2 studs				
36kN can be achieved.		,		
If the rim beam supporting the gre	ater load (us	ually the on	e supportin	ıg
the floor joists) at a panel junction	takes preced	dence over	the lighter	
loaded beam then this will ensure		•		
Wall panels are always to be lappe	ed in the oppo	osite manne	er to the	
rim beams.				
If no walls are present below rim b		_	ers	See nega DC 0 for typical
off adjacent rim beams. Typically (Julien Wulti F	nangers.		See page DC 9 for typical intersection details.
				intersection details.
Elastic Deflection Check				
		_		
Modulus Of Elasticity (min)		N/mm ²		
G (min)	633.45	N/mm ²		
Elastic Deflection	EA	mm		
Elastic Deflection Shear Deflection		mm mm		
Total Deflection	_	mm mm		
i otal Deliection	J.J			
Limiting Deflection @ L/30	166.7	mm		Deflection O.K.

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Rim Beam Design - Condition 5 - I	nternal wall sup	porting wors	t case floor	<u>spans</u> 140	mm studs
Depth of rim beam	241				
Width of rim beam (total)	135				
No.of Timbers	3		Glulam size if	applicable	
Material	Glulam GL28C	C27	45 x 250	Panel Ht:	2.4 m
Pagis Adm. Banding Street (Min)	1110				
Basic Adm. Bending Stress (Min) Basic Adm. Compressive Stress	14.18 7.55			Max distance be	twoon
K ₃	2.0			<u>appropriate</u> retu	
Maximum Bending Capacity:	_	kNm.		appropriate Tete	4.5 m
Max span of rim beam at collapse) m (<i>Based on</i>	the minimum of distan	
Max span of floor on beam at colla		9.50	-	return walls or 2.25 x	
Floor joist spans: (single or double):		Single			. ,
Effective span of floor on beam at	collapse:	9.50			
Floor dead load at collapse		1.83	kN/m ²		
30% imposed load at collapse		0.50	kN/m ²		
Wall load (if any) carried on rim bea	am:	0.00	kN/m		
(normally max 1 store	y as detail abov	e will repeat)		
Maximum UDL on rim beam is the	rfore:	11 07	kN/m		
Maximum bending moment in be		_	kNm	Section Adequa	ate
Maximum Reaction:		24.90			
The reaction needs adequate supp					
By observation an 89 x 38 stud wil					
conditions, therefore by applying a					
under collapse conditions. If 2 stud	ds are provided	at each junc	tion then		
36kN can be achieved.	rector load (us	ually the en	a aummartii	 -~	
If the rim beam supporting the g the floor joists) at a panel junction	· -	-		ng 	
loaded beam then this will ensu	•		_		
Wall panels are always to be lap		•			
rim beams.	pod III dilo opp		0. 10 1.10		
If no walls are present below rim	n beam end, pr	ovide hange	ers		
off adjacent rim beams. Typicall		_		See page DC 9	for typical
	-			intersection deta	• •
Elastic Deflection Check					
Modulus Of Elasticity (min)	12660	N/mm ²			
G (min)		N/mm ²			
- ()	200.10	. 1/11/11/11			
Elastic Deflection	29.6	mm			
Shear Deflection	1.4	mm			
Total Deflection	31.0	mm			
Limiting Deflection @ 1/20	450.0	mm		Deflection O.K	
Limiting Deflection @ L/30	150.0	111111		Deflection O.K.	

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Rim Beam Design - Condition 6 -	Internal wall sup	porting wors	t case floor s	spans 89.	/114mm studs
Depth of rim beam	250				
Width of rim beam (total)	45			1	
No.of Timbers	2	007	Glulam size if	i'	0.4
Material	Glulam GL28C	C27	115 x 495	Panel Ht:	2.4 m
Basic Adm. Bending Stress (Min)	12.58				
Basic Adm. Compressive Stress	7.55			Max distance b	etween
K ₃	2.0			appropriate ret	turn walls:
Maximum Bending Capacity:	12.98	kNm.			4.5 m
Max span of rim beam at collapse			•	the minimum of dista	nce between
Max span of floor on beam at colla	apse:	7.50		return walls or 2.25	x panel height.)
Floor joist spans: (single or double):		Single			
Effective span of floor on beam at	collapse:	7.50			
Floor dead load at collapse			kN/m ²		
30% imposed load at collapse			kN/m ²		
Wall load (if any) carried on rim be			kN/m \		
(normally max 1 store	ey as detail abov	e wiii repeat.	.)		
Maximum UDL on rim beam is the	erfore:	8.74	kN/m		
Maximum bending moment in b	eam:	22.12	kNm	Section Inaded	quate!
Maximum Reaction:		19.66	kN		
The reaction needs adequate supp	nort in the event	of a collars	,		
The reaction needs adequate sup By observation an 89 x 38 stud wi		-			
conditions, therefore by applying a					
under collapse conditions. If 2 students	-	-			
36kN can be achieved.	ac are provided	at odori juriot			
If the rim beam supporting the g	greater load (us	ually the on	e supportin	ig	
the floor joists) at a panel juncti		-			
loaded beam then this will ensu	re that there is	always 2 st	uds below.		
Wall panels are always to be lap	ped in the opp	osite manne	er to the		
rim beams.	_				
If no walls are present below rin		_	ers	0	A facility of
off adjacent rim beams. Typical	iy Cullen Multi	Hangers.		See page DC 9	• •
				intersection det	alls.
Elastic Deflection Check					
Modulus Of Electicity (min)	40000	N1/ma 2			
Modulus Of Elasticity (min)		N/mm ²			
G (min)	USS.45	IN/IIIM			
Elastic Deflection	62.8	mm			
Shear Deflection		mm			
Total Deflection	66.0				
Limiting Deflection @ L/30	150.0	mm		Deflection O.K	ζ.
				I	

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onate Collapse - Typical	Junction Details	
↓ [F	Floor Span	Junction Detail as Below
<u> </u>		
Typical Floor Configuration	<u>n</u>	
Typical Rim Beam Arrange	ement	
Typical Wall Panel/Stud A	rrangement	
	Typical Rim Beam Arrange	Calculation by Checked by

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Design of Post Base & Head Fixing

At the base & head the post is anchored to the rim beam via bracket 1 and into the floor deck, thro' the joist strap fixing into the floor deck.

Using 4.0mm screws x 40mm long thro straps into joist top face.

F from table 66, C16 timber basic shear load per screw = 361N

 $F_{adm} = F x K52 x K53 x K54 x K46$

 $F_{adm} = 361 \times 1.5 \times 1.25 =$ 677 N No. of screws per strap: 3 No. Capacity of one strap: 2.03 kN

Number of straps required is determined by the post height and width.

Height: 2.60 m

For this project the following post widths occur, with the number of straps indicated.

Post Width (mm) Min. No. of straps req'd. Min. No. of screws req'd.

90 2 3

Therefore for each post type use the number of straps and screws specified.

Strap to run over a minimum of 3 joists and fixed on top of deck.

Strap ref by Cullen: STR (top leg length)/200 - 30 x 2.5 x (overall length)o/a length with 4mm dia holes. Where straps run perpendicular to joists, noggins to be fitted.

NOTE: Hole diameter must be specified on details.

Alternative Design of Post Fixing

At the base, the post can be anchored to the sole plate via bracket 1 and the screws transfer the load into the floor deck.

Using 6mm coach screws into minimum 15mm ply/OSB floor decking

 $F_{adm} = F \times K_{52} \times K_{53} \times K_{54}$

F from table 62, C16/class1 using a No. 14 screw = 648N

 F_{adm} = 648 x 2 = 1.296kN per coach screw.

Using 6 screws (3 each side of bracket) = 7.78kN Number of screws can be varied according to reaction developed. Minimum loaded edge distance 10d = 60mm in the floor deck.

This detail only works for narrow posts up to 220mm wide. For wider posts use the detail above.

See Detail, page DC12

Use 6 No. 6mm coach screws - length to such the OSB/ply deck is fully penetrated. See detail, page DC11

Detail on page DC13 shows an arrangement for a concrete slab.

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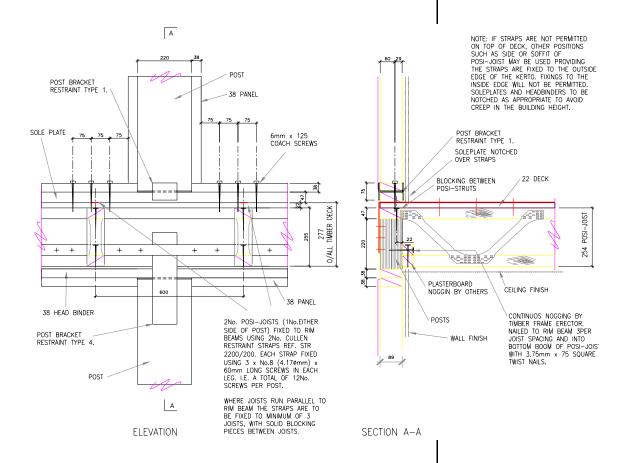
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DC 11

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#N/A

Post Base & Head Fixing With Panel Screwed Down



Note: Detail applicable to either I-Joists, solid joists or open web joists. The calculation shows the principal by which the detail works and may be modified to suit each particular job, providing sizes and materials are not downgraded.

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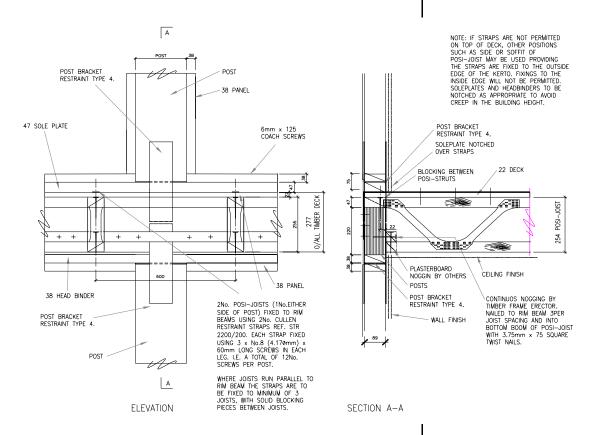
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#N/A

Post Base & Head Fixing Without Panel Screwed Down



Note: Detail applicable to either I-Joists, solid joists or open web joists.

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Post Anchorage to Ground Floor Concrete Slab or Beam & Block Floor

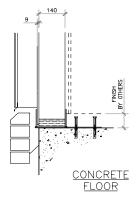
FIXINGS SHOWN INDICATIVE ONLY AND RELATE TO THE FIXING OF BRACKET 11. FOR SOLEPLATE FIXINGS GENERALLY REFER TO DETAILS 11&12

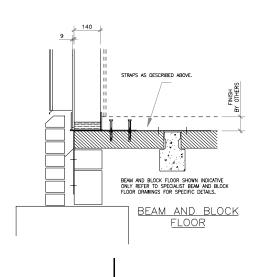
Fischer Lor fixing SXS	ng-shaft Item No.	Drill Ø mm	Min. drill hole depth with push-thro ass'ly	Min. drill anchorage depth mm	Plug length mm	Max object thickness mm	Fischer safety screw mm
Hexagon hd							
SXS 10x60 F US	19599	10	70	50	60	10	7 x 69

(Fixings to be installed in accordance with manufacturers recomendations)

EXM. AND BLOCK FLOORS REQUIRES STRIPES TO TRANSFER THE FORCE FROM THE BROCKET BACK NITO THE MAIN BODY OF THE FLOORS. THE SENDENCE THE SESTARY SAFE THE SAME DETAIL AND REFERENCE AS UPPER FLOORS. STRAPS ARE TO RIM ACROSS A MINIMUM OF 3 BEAMS AND TO BE FIXED WITH NO. 8 SCREWS (4.17mm s) PLUGGED TO CENTRE OF BLOCK. WHERE MULTIPLE STRAPS ARE REQUIRED THESE ARE TO BE PLACED AT 1000/c.

THE FOLLOWING POST WIDTH	DETAILS WILL APPLY. No. OF STRAPS.	No. OF SCREWS PER STRAP.
175mm	4	3
241mm	5	3
356mm	7	3
406mm	8	3





Note: The bracket arrangement shown applies to posts with relatively high horizontal reactions. Where small reactions are developed these can be resisted by using the bracket that slots over the soleplate as an upper floor e.g. bracket 1 - top of page 10. The soleplate can then be anchored down using the normal Fischer Fixings, providing there is enough edge distance. This will generally only apply to solid concrete and not beam and block floors.

The basic unmodified shear load of a 7mm screw in pre-drilled 22mm timber is 0.66kN Modified by k_{59} for very short term loading at 1.25 gives a load of 0.825kN.

Therefore use number required to satisfy horizontal loading criteria. Minimum edge disatnce for concrete to be 50mm with an ultimate load of approx 6kN

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#N/A

Rim Beam Connections if Required See detail on page DC 15

It some instances it may be necessary to connect rim beams together at a corner, say over a post.

The capacity of this connection is limited by by the bolt / timber.

Using 220 deep x 90 wide rim beams.

Loaded end distance = 7d Loaded edge distance = 4d Minimum c/c = 4d

 $F_{adm} = F \times K_{56} \times K_{57} \times K_{46}$

Using M12 bolts F from table 64 using long term loads in C27 timber = 2.52kN

 $F_{adm} = 2.52 \times 1.0 \times 1.25 \times 2 = 6.3 \text{kN}$ modified for short term loads.

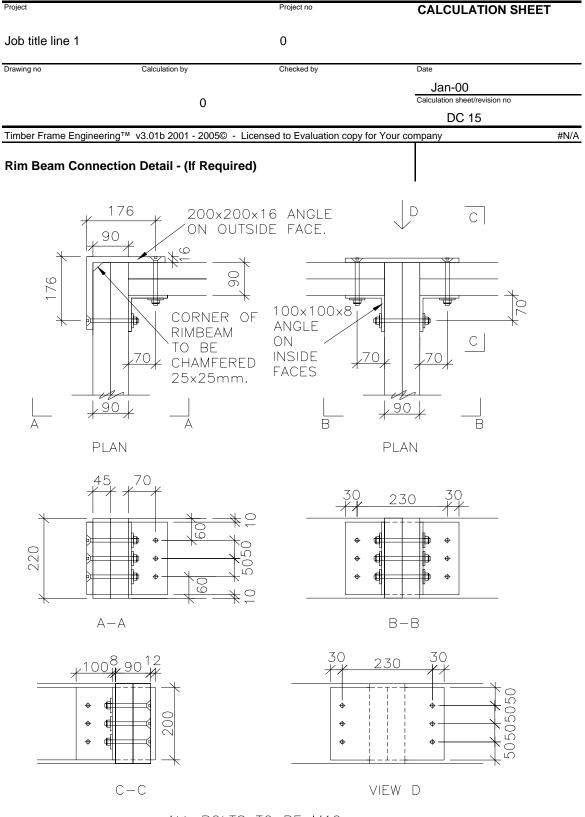
Therefore 3 bolts = 18.9kN Therefore 2 bolts = 12.6kN Therefore 1 bolt = 6.3kN

To achieve minumum edge & end distances use:

internal angle of **100 x 100 x 8 L** with a back mark of 70mm and 50mmc/c. with an external angle of **200 x 200 x 16L** with a back mark of 175mm Note countersunk bolts reqd on o/s face.

At a 'T' junction an external plate of **290 x 200 x 12Plt** with holes at $230 \times 50 \text{ c/c}$ - c/s as rquired.

Note: calc based on 220 x 90 rim beam.



ALL BOLTS TO BE M12, WITH COUNTERSUNK HEADS ON EXTERNAL FACES.

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Party Wall	Γies	Cullen STR	Straps - 30	x 2.5 section	n with 4mm	dia holes.			
-		be pre-drille		_	-				
Using max 1	140mm studs	s with a max	70mm cavity	and 3.75dia	x 30 long sq				
						Eff dia = 2.6	65mm		
-		= 13mm (5d)	(- 1)						
		grain = 18mr							
		grain = 55mm ails in 89 pa r	` '	n 114 nanole	s = 3no and	 in a 140± n-	anel – 4no		
Therefore in	ilax ilo.oi ile	ans in 09 pai	1615 – 2110, 11	ii i i 4 paneis	5 = 3110, and	ша 140+ ра 	anci – 4110.		
Plate cross	section 2.5m	nm thk x 30mi	m wide. Net	area = (30 - 4	1) x 2.5 = 65r	nm²			
				(00	., =				
Plate Buckli	<u>ng</u>								
	-	(40 + 70 + 40	•		plate buckles be	etween inside na I	ails)		
$ryy = (I/A)^{1/2}$	$1.5 = ((30 \times 2))$	2.5^3/12) / 30	$\times 2.5)^{0.5} =$	0.722					
L/ryy = 128/	n 722 – 177		nc - 55N/mi	m^2 (table 24)					
L/1yy = 120/	0.122 - 111		pc = 3314/1111	(BS 5950:pt 1)		Use Cullen	STR Straps	S	
$Pc = 65 \times 55$	5 = 3.57kN			(======================================			mm section		
		1.4 = 2.55kN	l (Nail capacitie	s govern)		with a max			
•			,	,		width of 70	-		
Nailing						Holes 4mm dia for			
- 						3.75mm dia x 30 long			
-		long square to				square twis			
Basic load = 0.258kN K 44 = 1.2						_	or nails = 18		
Red.= 30/45=0.66 k46 = 1.25					Spacing for	r nails = 25r	nm.		
E = 0.259 v	1 2 v 1 25 v	1 25 v 0 66 -	k48=1.25	oil		Straps to be	nocitioned		
$F = 0.258 \times 1.2 \times 1.25 \times 0.66 = 0.319 \text{kN} / \text{nail}.$						-	ey do not cau	use	
Using 2 nails	s F (kN) =	0.638	89mm studs	S			height to cre		
Using 3 nails	` '	0.957	114mm stud				. 5		
Using 4 nail	` '	1.276	140mm stud						
			•						
	4	ie Force kN/m		% reduction in party wall length	Wind at 90		1 .	7	
Floor Level	Wind at 0 ⁰	Wind at 90 ⁰	Stud Size	at stair core etc	No of Ties / m	Single/Double	Centres (mm)	4	
Poof	#DIV/0!	#DIV//0I	80mm atuda	00/	#DIV/0I	Single	0		
Roof 5th Floor	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	89mm studs 89mm studs	0% 0%	#DIV/0! #DIV/0!	Single Single	0 0		
30111001	#D1V/0:	#DIV/U:	oomini stuus	0 /0	#DIV/0:	Girigie	0		

	Horizontal Lie Force kN/m			party wall length	Wind at 90		
Floor Level	Wind at 0 ⁰	Wind at 90 ⁰	Stud Size	at stair core etc	No of Ties / m	Single/Double	Centres (mm)
Roof	#DIV/0!	#DIV/0!	89mm studs	0%	#DIV/0!	Single	0
5th Floor	#DIV/0!	#DIV/0!	89mm studs	0%	#DIV/0!	Single	0
4th Floor	#DIV/0!	#DIV/0!	89mm studs	0%	#DIV/0!	Single	0
3rd Floor	#DIV/0!	#DIV/0!	89mm studs	0%	#DIV/0!	Single	0
2nd Floor	#DIV/0!	#DIV/0!	89mm studs	0%	#DIV/0!	Single	0
1st Floor	#DIV/0!	#DIV/0!	89mm studs	0%	#DIV/0!	Single	0

It is appropriate to consider a reduction in the tie force due to the resistance of the weakest windward unit. Approx percentage reduction utilized above in each direction based upon % 1st unit racking resistance / total required.

Wind at 0⁰ **25%**

Wind at 90⁰ **25%**

NOTE: Centres should not be closer than 1200c/c. If centres are closer then special ties are required.

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#N/A

Headbinder Design

It is usual in timber frame construction to have a headbinder above the top rail of the panel. This is used so that the joists do not have to coincide with the stud below. It is generally accepted that where a headbinder is present no design checks are required on the capacity on the two rails to carry the joist reaction to the adjacent studs. Where no headbinder is present the maximum offset between joist and stud is half the joist width.

However, provided the Designer can demonstate that a single top panel rail is adequate there is no other design requirement for a headbinder.

One considerations to be made before omitting the headbinder is the practical issue of being able to align the panels. Where single panels generally intersect at corners or at incoming walls there is less of a requierment than where long walls are constructed from numerous panels.

One advantage in omitting the headbinder is that it reduces the potential for cross grain shrinkage.

Consider the following conditions for headbinder designs.

1. Party wall
2. External wall
3. Internal wall
4. Internal wall
5. Roofs
89 mm studs
89 mm studs
89 mm studs
89 mm studs
89 mm studs

Not all combinations may occur on this project.

Since the joist reaction can be applied at any point check for maximum shear stress in addition to bending. Other materials in addition to CLS may be used and there shear stress values are listed below. If the headbinder should fail in either shear or bending then the studs

must be positioned below the joist reaction to negate this condition.

Note: The reference to headbinder also includes the top rail to the panel. It is the timber rail/s which carry the joist reactions.

The bending moment and shear force coefficients have been taken from the Timber Designers Manual.