

# Floor

## SYSTEMS

### FLOOR JOISTS

UltraBEAM sections provide class leading performance for Floor Joist applications including:-

- MEZZANINE PLATFORMS
- MODULAR & PORTABLE BUILDINGS
- STORAGE & WORK AREAS
- WALKWAYS

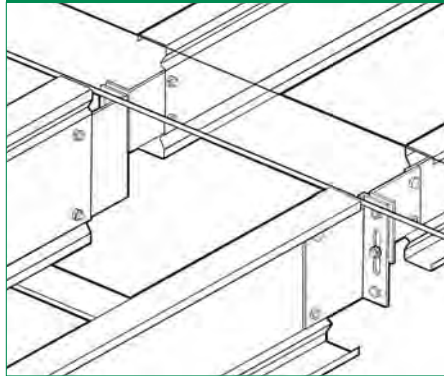
Commercial applications including:

- OFFICES
- HOTELS
- ACCOMMODATION BUILDINGS
- DOMESTIC FLOORS
- BUILDING AND LOFT CONVERSIONS
- REFURBISHMENT PROJECTS
- REPLACEMENT JOISTS
- UPGRADING WORK

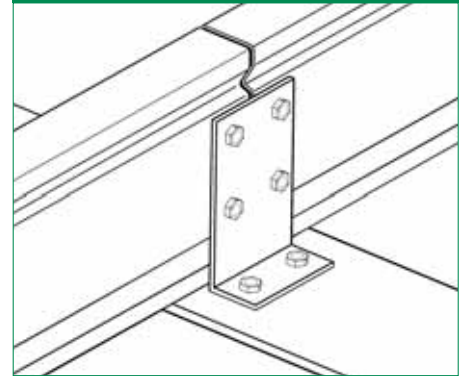
Accurately engineered from high tensile pre-galvanised steel, UltraBEAM Floor Joist systems offer a reliable alternative to traditional materials.

Simple end connection details and the ability to be site worked makes them eminently suitable for a wide range of uses - even where pre-engineered solutions may be impractical.

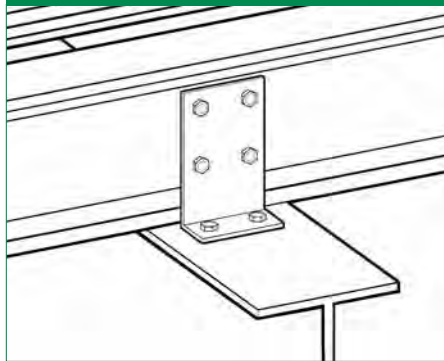
#### INSET



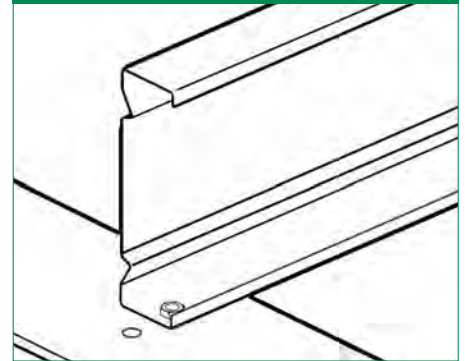
#### CLEAT FIXED SINGLE SPAN



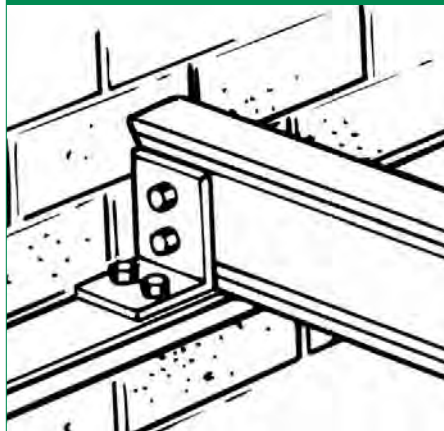
#### CLEAT FIXED DOUBLE SPAN



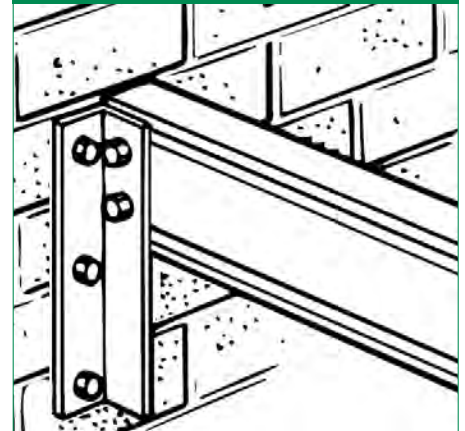
#### SINGLE/DOUBLE SPAN FLANGE FIXED



#### MASONRY CONNECTION



#### MASONRY CONNECTION



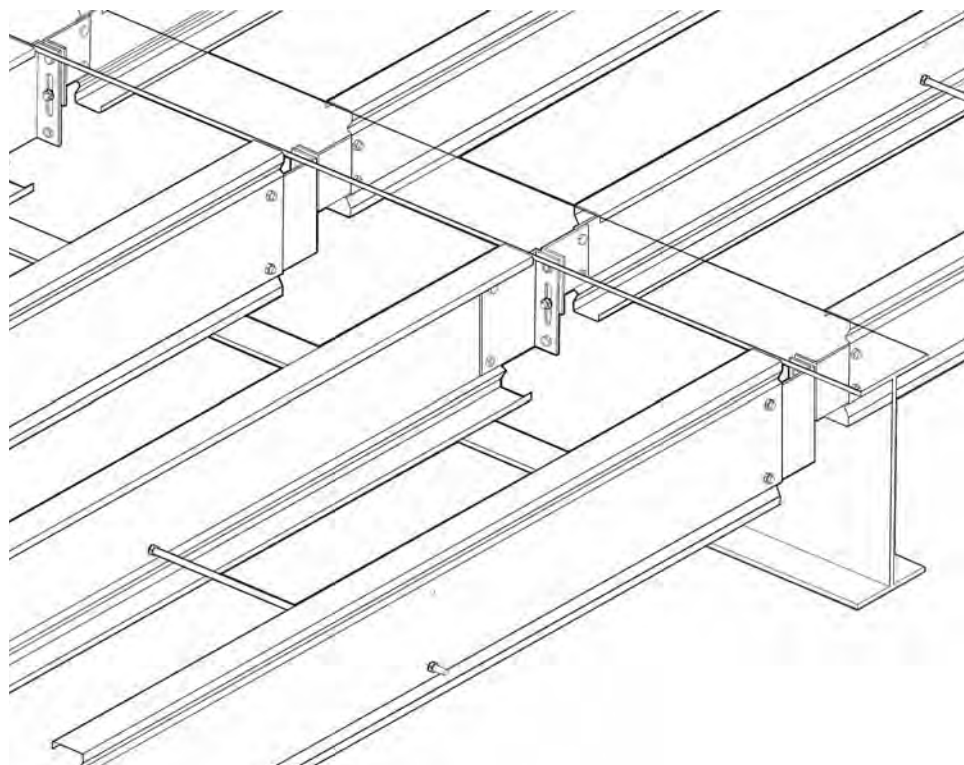
# Floor

## INSET SYSTEM & TIE BARS

### UltraBEAM INSET FLOOR JOIST SYSTEM

The UltraBEAM inset floor joist system is utilised for mezzanine floors where maximising headroom may be paramount. The UltraBEAM joists are connected between primary beam members using our standard range of hot dipped galvanised cleats. These cleats are available in two formats - MFS (short) and MFL (long) which satisfies all common primary beam flange widths.

To optimise floor joist selection the designer may specify different UltraBEAM joist depths to suit varying span and/or load criteria within adjacent floor areas. This is possible because all 255 - 305 series cleats have a slotted centralised hole which allows different joist depths to be installed via common bolt holes (see table on page 54 for allowable joist depth combinations).



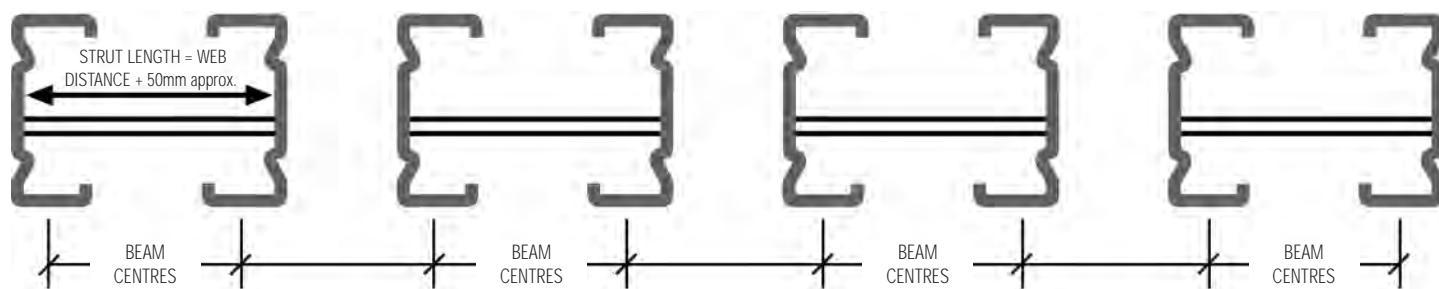
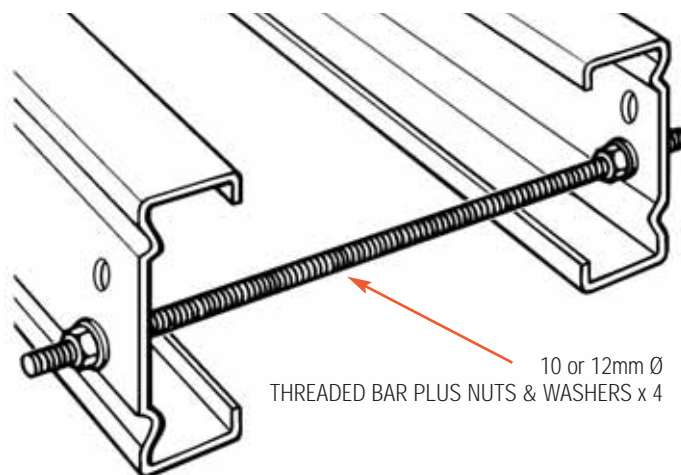
### TIE BARS

UltraBEAM Floor joists must be designed as opposing pairs with a Tie Bar fixed as shown.

Tie Bar at mid-span < 6m span.

2 Tie Bars at  $\frac{1}{3}$  span  $\geq$  6m span.

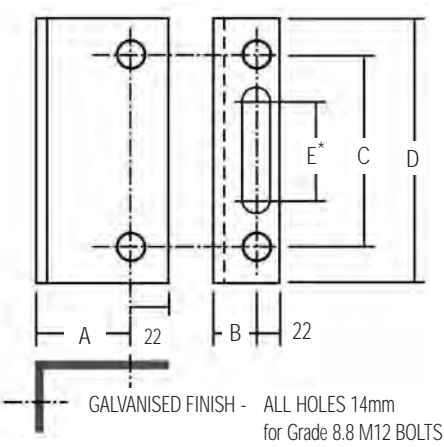
TIES MUST BE FITTED PRIOR TO THE LAYING OF FLOOR DECKING.



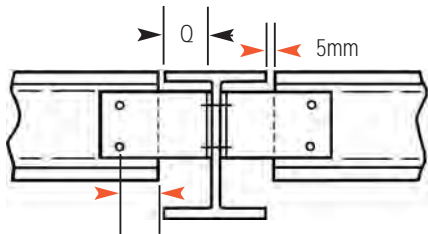
TIE BAR FITTED THROUGH LOWER HOLE OF PAIR PUNCHED ON STANDARD GAUGE LINE.

# Floor

## INSET CLEATS



From inside face of beam web



Minimum 20mm. (Varies to suit primary beam/cleat dimensions).

## MFS SERIES FOR PRIMARY BEAMS WHERE DIM. Q = 85mm MAX

Section	Thickness	Dim. A	Dim. B	Dim. C	Dim. D	DIM. E*	Reference
145	5	110	30	37	75	N/A	MFS - 145
170	5	110	30	62	100	N/A	MFS - 170
200	5	110	30	50	100	N/A	MFS - 200
225	5	110	30	75	120	N/A	MFS - 225
255	5	110	35	105	150	45	MFS - 255
285	5	110	35	135	180	75	MFS - 285
305	5	110	35	155	200	75	MFS - 305

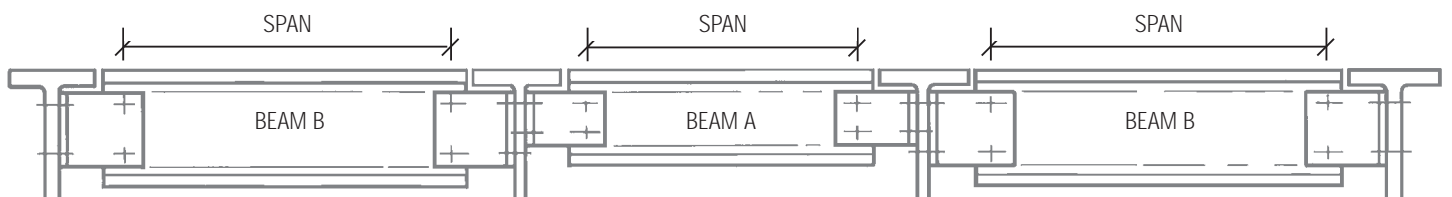
## MFL SERIES FOR PRIMARY BEAMS WHERE DIM. Q = 86-105mm

Section	Thickness	Dim. A	Dim. B	Dim. C	Dim. D	DIM. E*	Reference
145	6	130	30	37	75	N/A	MFL - 145
170	6	130	30	62	100	N/A	MFL - 170
200	6	130	30	50	100	N/A	MFL - 200
225	6	130	30	75	120	N/A	MFL - 225
255	6	130	35	105	150	45	MFL - 255
285	6	130	35	135	180	75	MFL - 285
305	6	130	35	155	200	75	MFL - 305

NB \*SLOT FACILITATES VARIOUS UltraBEAM JOIST COMBINATIONS AS LISTED IN TABLE BELOW

## PERMISSIBLE UltraBEAM JOIST COMBINATIONS

Beam A	Permissible combination Beam B						
	145	170	200	225	255	285	305
145	✓						
170		✓					
200			✓		✓	✓	✓
225				✓		✓	✓
255			✓		✓		✓
285			✓	✓		✓	
305			✓	✓	✓		✓



NB: Span in load tables = distance between hole centres.  
Span in design software = primary beam centres, i.e. cleat dimensions allowed for.

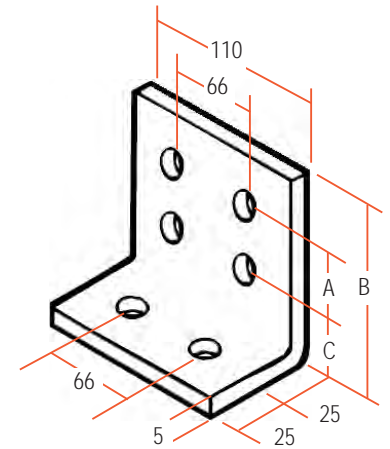
# Floor

## TOP CLEAT SYSTEM

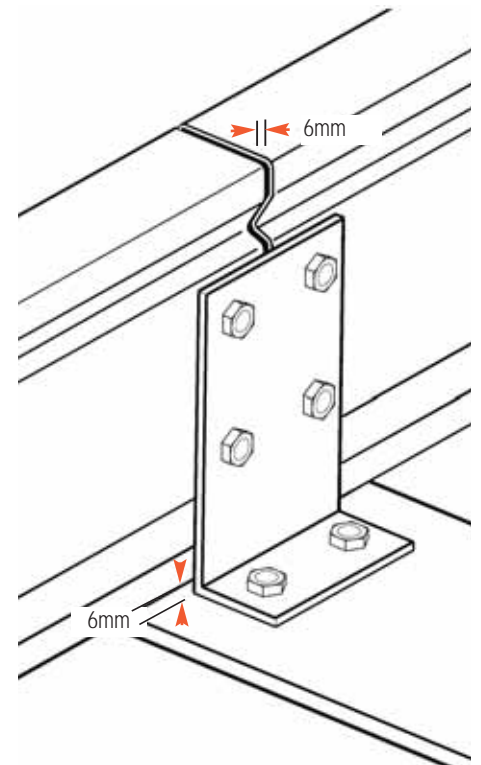
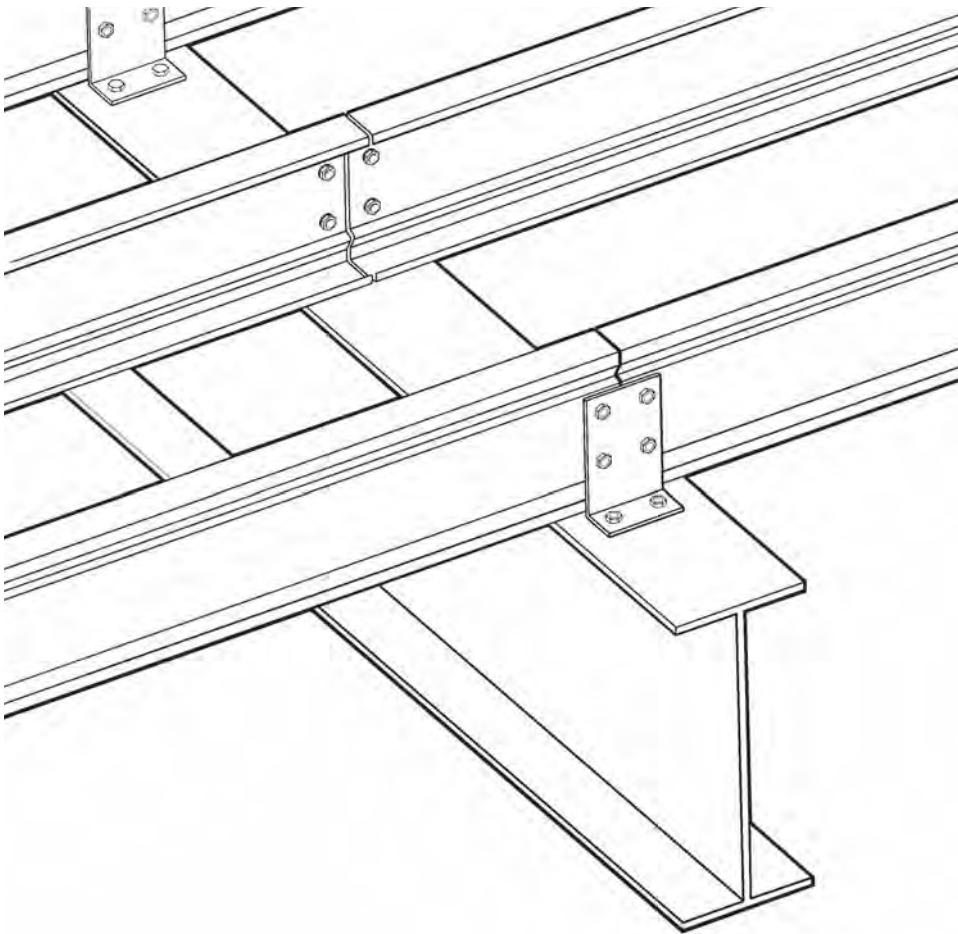
### TOP CLEAT FOR SINGLE SPANNING OR DOUBLE SPANNING SYSTEMS

Section	Dim. A	Dim. B	Dim. C	Reference
145	37	119	60	MTC145
170	62	144	60	MTC170
200	50	153	81	MTC200
225	75	178	81	MTC225
255	105	208	81	MTC255
285	135	238	81	MTC285

For Double Spanning load capacity of UltraBEAM sections use UltraPRO.Design Software



GALVANISED FINISH  
ALL HOLES 14mm for Grade 8.8 M12 BOLTS



### TIE BARS

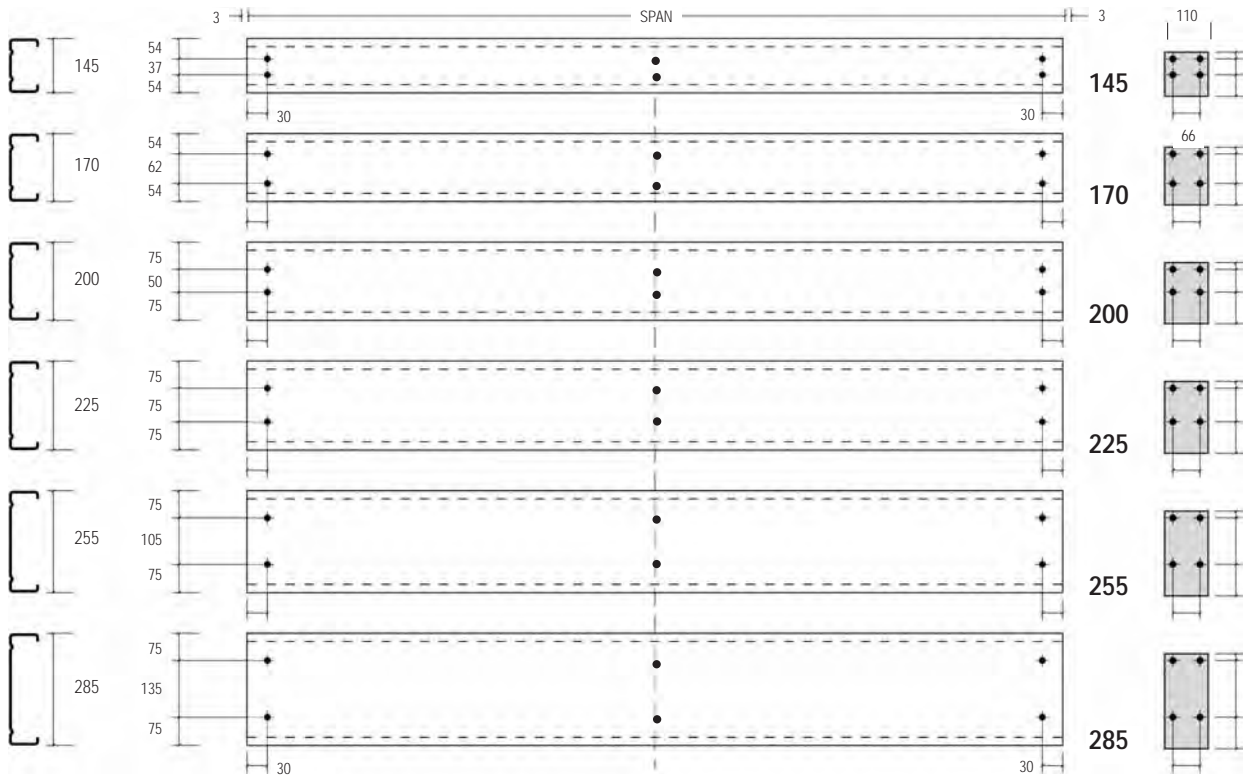
UltraBEAM Floor joists must be designed as opposing pairs with a Tie Bar fixed as shown.  
Tie Bar at mid-span < 6m span.  
2 Tie Bars at  $\frac{1}{2}$  span  $\geq$  6m span.

TIES MUST BE FITTED PRIOR TO THE LAYING OF FLOOR DECKING.

## TOP CLEAT SYSTEM HOLE CONFIGURATION

STANDARD HOLE DETAILS. **ALL HOLES ARE 14mm DIAMETER FOR Grade 8.8 M12 BOLTS**  
 We recommend that all bolts and washers are plated or galvanised against corrosion.

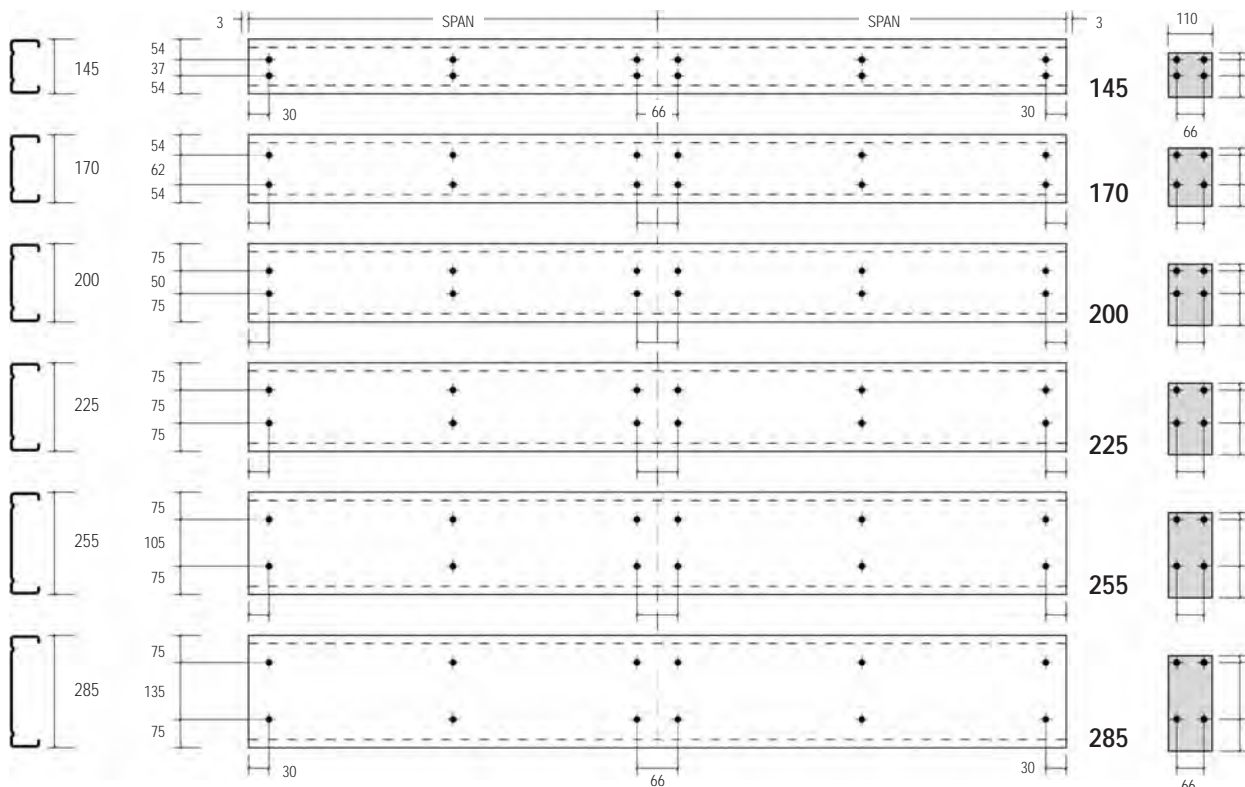
### TOP CLEAT FIXED SINGLE SPAN



MAX. OVERHANG = SPAN/8

LENGTH OF BEAM = SPAN LESS 6mm

### TOP CLEAT FIXED DOUBLE SPAN



MAX. OVERHANG = SPAN/8

LENGTH OF BEAM = SPAN + SPAN LESS 6mm

For double spanning joists where spans vary >10% consult Hadley Rolled Products.

# Floor

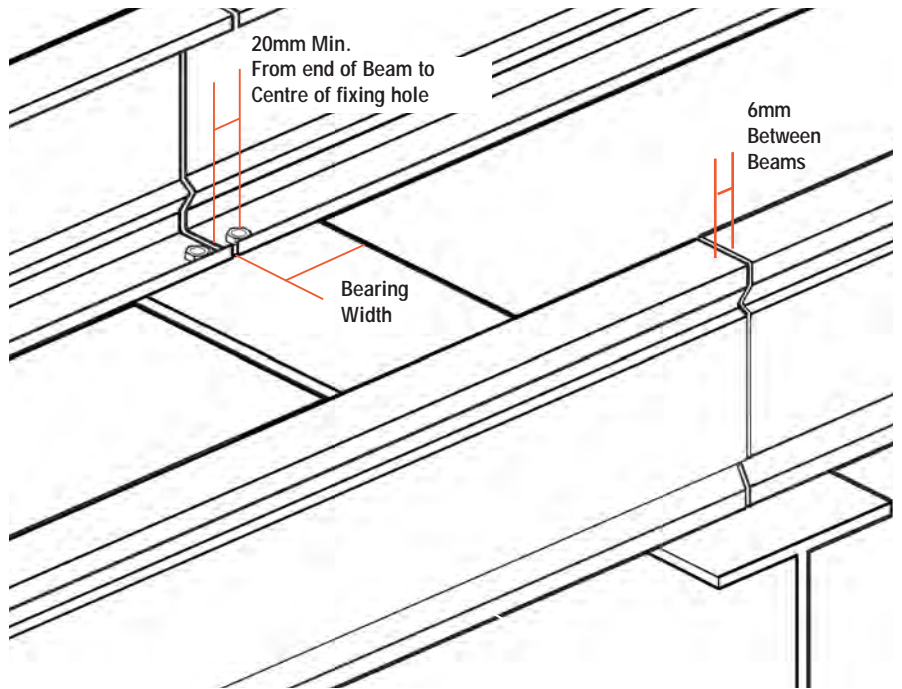
## FLANGE FIXED SYSTEM

### FLANGE FIXED SYSTEM

UltraBEAM Floor joist sections may be fixed directly to support structures by bolting through the bottom flange. Carrying capacity is reduced due to limitations imposed by web crushing, however this system does offer some advantages due to fewer component parts and simplified end connections - especially for refurbishment projects where on site adjustments may be necessary. Use UltraPRO. Design Software to select Flange Fixed Floor beams.

For double spanning joists where spans vary >10% consult Hadley Rolled Products' technical department.

MAX OVERHANG = SPAN/12



Dim. A  
145 - 170 SERIES = 25mm  
200 - 285 SERIES = 42mm

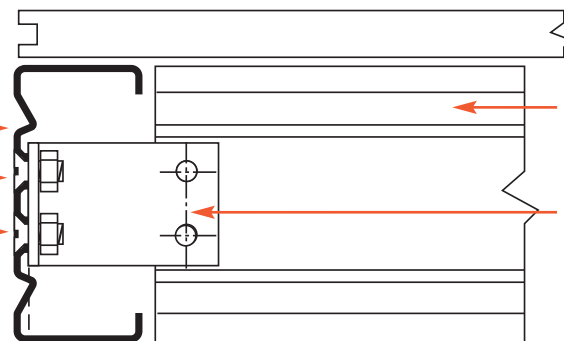
Dim. A

### COUNTER FORMED HOLES CONNECTION DETAILS

Perimeter/edge beam

UltraBEAM section - pre-counter formed holes as required

M12 CSK headed bolts

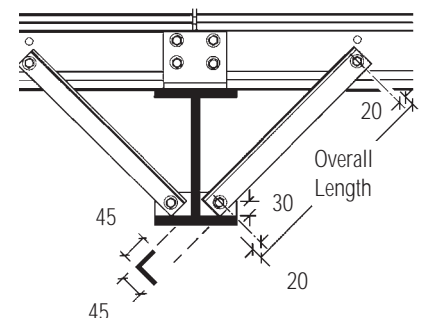
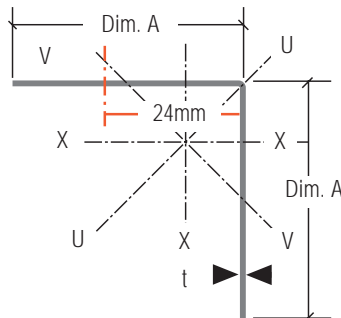


FLUSH FACE NO BOLT HEAD PROTRUSION

Counter formed depth 5mm

### PRIMARY RESTRAINTS

Primary structure stays are manufactured from pre-galvanised cold roll-formed 45 x 45 x 2mm steel angle, cut and pierced to accept M12 bolts to customer requirements.



Dim. A (mm)	t (mm)	WEIGHT kg/m	I <sub>xx</sub> /I <sub>yy</sub> cm <sup>4</sup>	I <sub>w</sub> cm <sup>4</sup>	I <sub>uu</sub> cm <sup>4</sup>	Z <sub>xx</sub> /Z <sub>yy</sub> cm <sup>3</sup>
45	2.0	1.35	3.43	1.44	5.52	2.65

# Floor

## MASONRY CONNECTIONS

### GENERAL

UltraBEAM Floor joists should be designed as opposing pairs tied at mid-span as shown on page 53 prior to the laying of Floor Decking.

Floor Decking must be securely fixed with Self Tapping or similar screws in accordance with Decking Manufacturers recommendations so that lateral restraint is afforded to the UltraBEAM top (compression) flange at no more than 1000mm maximum fastener spacing.

All fixing Connection Bolts to be plated M12 Grade 8.8 set screws with 2 number washers fitted unless Counter Sunk Headed Bolts are used.

If primary structural steel requirements call for lateral restraint to be provided to the lower flange of primary members our Rafter/Column Restraints may provide a solution - for further assistance contact our technical department.

Deflection should be considered with sympathy for use to which the floor may be subjected - both as a ratio of span and for dimensional movement on large spans.

UltraBEAM sections may be fixed either through web connections or flange fixed with their design capacity being taken from the relevant load tables or design software.

For double spanning joists where spans vary >10% consult Hadley Rolled Products' technical department.

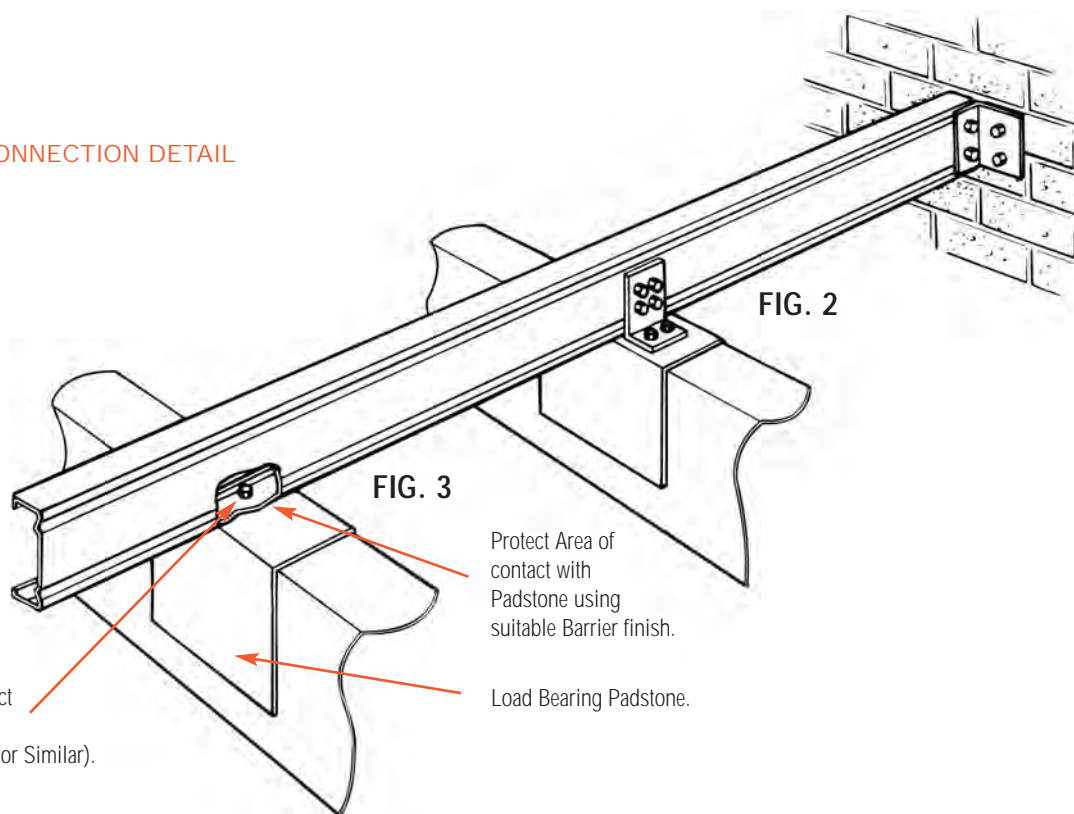
When connecting UltraBEAM sections to existing walls one of the methods detailed may be employed and the structure checked for suitability and safety. Consideration should be given to ensuring that all Beams are level and some form of adjustment may be desirable.

Where end connections are required to be within the depth of the Floor Beam section - for example to accept a directly fixed ceiling the details shown in fig.1 may be considered.

For walls under construction the detail shown in fig. 6 offers a more traditional method of end connection using face fixed Angle Ties which are bolted in position after the Beam has been built into the wall under construction. The end of the Beam built into the wall should be set on a suitable padstone and protected against chemical attack with a suitable barrier finish.

Where UltraBEAM sections are required to oversail walls, figures 2 and 3 show typical construction methods. If a flange fixed solution is chosen the contact area of the section with the padstone should be protected with a suitable barrier against corrosive attack by chemical reaction.

### MASONRY CONNECTION DETAIL



Flange Fixing Direct to Padstone (Chemical Anchor or Similar).

FIG. 4 Flange Fixed to Ledger

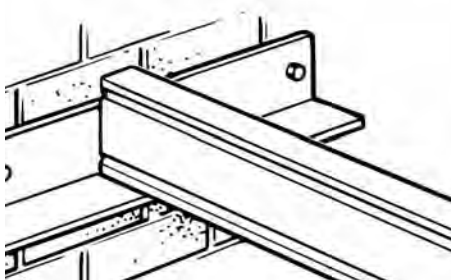


FIG. 5 Cleat Fixed to Ledger

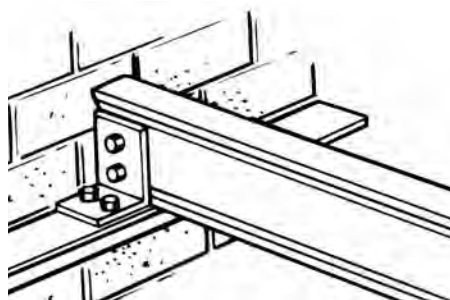
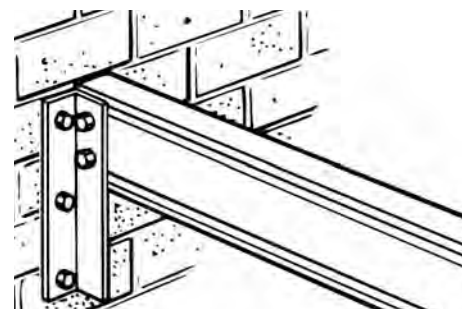


FIG. 6 Built-in with Face Fixed Angle Tie

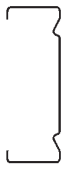


# Section Properties

KEY TO UltraBEAM SYSTEMS REFERENCE EXAMPLE: 2006316



Section Reference	t (mm)	Mass (kg/m)	Area (cm <sup>2</sup> )	I <sub>xx</sub> (cm <sup>4</sup> )	I <sub>yy</sub> (cm <sup>4</sup> )	R <sub>xx</sub> (cm)	R <sub>yy</sub> (cm)	Z <sub>yy</sub> (cm <sup>3</sup> )	Z <sub>xx</sub> (cm <sup>3</sup> )	C <sub>y</sub> (mm)	Q Factor	C <sub>x</sub> (mm)
1456312	1.20	2.78	3.56	118.34	16.96	5.78	2.19	3.85	14.82	17.56	0.78	72.50
1456313	1.30	3.01	3.86	127.85	18.32	5.78	2.19	4.16	16.34	17.58	0.82	72.50
1456314	1.40	3.22	4.14	137.30	19.68	5.78	2.19	4.48	17.85	17.60	0.84	72.50
1456316	1.60	3.67	4.72	155.98	22.33	5.78	2.19	5.10	20.84	17.62	0.90	72.50
1456318	1.80	4.11	5.29	174.30	24.88	5.77	2.18	5.71	23.78	17.63	0.94	72.50
1456320	2.00	4.55	5.84	192.38	27.39	5.76	2.17	6.32	26.70	17.64	0.96	72.50
1706312	1.20	3.01	3.86	171.33	17.81	6.68	2.15	3.92	17.47	16.19	0.72	85.00
1706313	1.30	3.26	4.18	185.16	19.25	6.68	2.15	4.24	19.35	16.20	0.75	85.00
1706314	1.40	3.50	4.49	198.11	20.76	6.68	2.15	4.56	21.23	16.22	0.78	85.00
1706316	1.60	3.98	5.12	226.13	23.48	6.68	2.15	5.20	24.93	16.23	0.83	85.00
1706318	1.80	4.46	5.74	252.87	26.17	6.67	2.15	5.82	28.58	16.24	0.87	85.00
1706320	2.00	4.94	6.34	279.30	28.82	6.66	2.14	6.44	32.20	16.25	0.90	85.00
2006312	1.20	3.35	4.27	242.73	18.78	7.67	2.13	4.07	21.71	16.27	0.77	100.00
2006313	1.30	3.63	4.62	262.90	20.28	7.66	2.13	4.40	24.07	16.27	0.79	100.00
2006314	1.40	3.90	4.96	282.95	21.75	7.66	2.12	4.73	26.63	16.28	0.82	100.00
2006316	1.60	4.44	5.65	322.69	24.64	7.65	2.11	5.37	31.47	16.29	0.87	100.00
2006318	1.80	4.97	6.33	361.97	27.46	7.65	2.11	6.00	35.93	16.31	0.90	100.00
2006320	2.00	5.51	7.01	400.77	30.20	7.64	2.10	6.64	40.08	16.32	0.92	100.00
2006325	2.50	6.78	8.03	495.75	36.72	7.64	2.08	8.09	49.58	16.34	0.97	100.00
2256314	1.40	4.17	5.31	374.92	22.52	8.52	2.09	4.79	31.40	15.25	0.77	112.50
2256316	1.60	4.75	6.05	427.74	25.52	8.52	2.08	5.44	37.11	15.27	0.81	112.50
2256318	1.80	5.33	6.78	479.98	28.43	8.51	2.07	6.07	42.34	15.28	0.84	112.50
2256320	2.00	5.90	7.51	531.64	31.27	8.50	2.06	6.70	47.26	15.30	0.86	112.50
2256323	2.30	6.72	8.55	608.03	35.39	8.50	2.05	7.60	54.05	15.31	0.89	112.50
2256325	2.50	7.27	9.26	658.24	38.04	8.50	2.04	8.19	58.51	15.32	0.91	112.50
2557514	1.40	4.83	6.15	569.36	38.82	9.76	2.55	6.97	39.45	18.59	0.68	127.50
2557515	1.50	5.17	6.58	609.82	41.46	9.76	2.54	7.45	43.25	18.60	0.70	127.50
2557516	1.60	5.51	7.01	650.09	44.08	9.75	2.54	7.93	47.17	18.61	0.73	127.50
2557518	1.80	6.17	7.86	730.05	49.22	9.75	2.53	8.87	54.88	18.62	0.77	127.50
2557520	2.00	6.77	8.62	809.26	54.26	9.74	2.52	9.80	62.18	18.63	0.80	127.50
2557523	2.30	7.80	9.93	926.64	61.60	9.74	2.51	11.16	72.68	18.63	0.83	127.50
2557525	2.50	8.44	10.75	1003.96	66.36	9.74	2.50	12.04	78.74	18.66	0.85	127.50
2557530	3.00	10.05	12.79	1193.99	77.79	9.73	2.48	14.19	93.65	18.69	0.89	127.50
2857515	1.50	5.52	7.03	795.37	42.77	10.78	2.50	7.51	50.72	17.46	0.66	142.50
2857516	1.60	5.88	7.49	848.00	45.47	10.78	2.50	8.01	55.25	17.47	0.68	142.50
2857518	1.80	6.60	8.40	952.58	50.78	10.77	2.49	8.97	64.18	17.48	0.72	142.50
2857520	2.00	7.24	9.22	1056.22	55.97	10.76	2.48	9.91	72.65	17.50	0.75	142.50
2857523	2.30	8.34	10.62	1209.94	63.55	10.76	2.47	11.28	84.91	17.51	0.78	142.50
2857525	2.50	9.03	11.50	1311.26	68.46	10.76	2.46	12.18	92.02	17.52	0.81	142.50
2857530	3.00	10.75	13.69	1560.54	80.26	10.75	2.44	14.35	109.51	17.56	0.83	142.50
3057515	1.50	5.76	7.33	936.15	43.56	11.46	2.47	7.58	55.95	16.77	0.63	152.50
3057516	1.60	6.13	7.81	998.19	46.30	11.45	2.47	8.06	60.91	16.78	0.66	152.50
3057518	1.80	6.88	8.76	1121.46	51.71	11.44	2.46	9.02	70.69	16.80	0.69	152.50
3057520	2.00	7.56	9.62	1243.68	57.00	11.44	2.45	9.97	79.97	16.82	0.72	152.50
3057523	2.30	8.70	11.08	1425.03	64.71	11.44	2.44	11.35	93.27	16.82	0.75	152.50
3057525	2.50	9.43	12.00	1544.62	69.72	11.44	2.43	12.25	101.29	16.84	0.76	152.50
3057530	3.00	11.22	14.29	1839.02	81.73	11.42	2.41	14.44	120.59	16.88	0.80	152.50



## DIMENSIONS

Dim. D	Dim. B	Dim. C	Dim. L	Dim. E	Dim. F	Dim. G	Dim. H
145	63	75	14	35	9	37	25
170	63	100	14	35	9	62	25
200	63	100	14	50	12.5	50	42
225	63	125	14	50	12.5	75	42
255	75	155	17	50	12.5	105	42
285	75	185	17	50	12.5	135	42
305	75	205	17	50	12.5	155	42

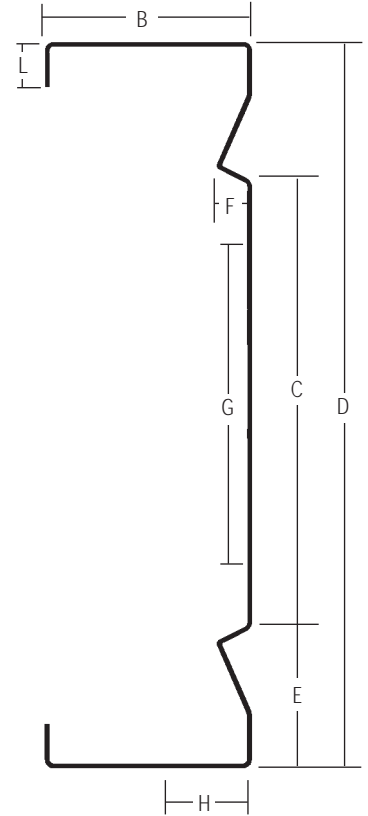
**ALL HOLES 14 Dia. FOR GRADE 8.8 M12 BOLTS**  
All dimensions in mm. Drawings not to scale.

# Dimensions

## Floor Beams

For Cladding Rails see pages 5 & 6

### SERIES 145 - 305



### GENERAL

UltraBEAM Floor joists should be designed as opposing pairs tied at mid-span as shown on page 53 prior to the laying of Floor Decking.

Floor Decking must be securely fixed with Self Tapping or similar screws in accordance with Decking Manufacturers recommendations so that lateral restraint is afforded to the UltraBEAM top (compression) flange at no more than 1000mm maximum fastener spacing.

All fixing Connection Bolts to be plated M12 Grade 8.8 set screws with 2 number washers fitted unless Counter Sunk Headed Bolts are used.

If primary structural steel requirements call for lateral restraint to be provided to the lower flange of primary members our Rafter/Column Restraints may provide a solution - for further assistance contact our technical department.

Deflection should be considered with sympathy for use to which the floor may be subjected - both as a ratio of span and for dimensional movement on large spans. UltraBEAM sections may be fixed either through web connections or flange fixed with their design capacity being taken from the relevant load tables or design software.

# Floor

## SERVICES

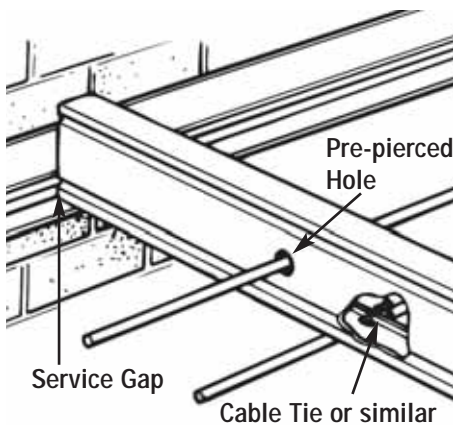
If site working of UltraBEAM sections are necessary the design parameters governing hole sizes and positions should be adhered to.

Services should be suspended below Beams, through prepared holes or within a suitable space designed between the Beam and its connection with the wall.

UNDER NO CIRCUMSTANCES SHOULD UltraBEAM SECTIONS BE NOTCHED TO ALLOW THE PASSAGE OF SERVICES OR FOR ANY OTHER REASON WITHOUT CONSULTING OUR TECHNICAL DEPARTMENT.

Where services are in contact with UltraBEAM members consideration to the effect of section edges should be given and suitable protection specified if necessary.

For further assistance on the use of UltraBEAM Floor Beam Sections please consult our Technical Department



# Notes