

"VITAGRID"[®] INDUSTRIAL TYPE METAL FLOORING, WALKWAYS AND STAIRTREADS

THE MINIMUM ACCEPTANCE CRITERIA FOR
THE SUPPLY, MANUFACTURE AND DETAILING OF
GRATINGS, STAIRTREADS AND HANDRAILS.

PRODUCED BY
VITAL ENGINEERING (PTY) LTD AND
ANGUS McLEOD AND COMPANY (PTY) LTD
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AUTHOR: D.B. PRINGLE

TABLE 1 . PERMISSIBLE TOLERANCES	
LOCATION	TOLERANCE IN MM
LENGTH OF GRATING	±5
WIDTH OF GRATING	±5
DEPTH OF LOADBEARING BAR:	
UP TO AND INCLUDING 25mm	+1.0 -0.5
OVER 25mm UP TO 50mm	+1.5 -0.75
OVER 50mm UP TO 100mm	+2.0 -1.0
OVER 100mm UP TO 150mm	+2.0 -1.5
THICKNESS OF LOADBEARING BAR:	
UP TO 10mm	±0.5
OVER 10mm UP TO 15mm	±0.6

TABLE 2 . MANUFACTURING TOLERANCES	
LOCATION	TOLERANCE
DIFFERENCE BETWEEN DIAGONALS	±5mm (OUT OF SQUARENESS OF GRATING PANEL)
CROSS BARS IN EITHER DIRECTION FROM PERPENDICULAR ALIGNMENT WITH BEARING BARS	1:100
CROSS BAR SPACING	+5mm PER 1500mm LENGTH OF LOADBEARING BARS
LOADBEARING BAR LEAN	1:10
TRANSVERSE BOW OF PANEL BEFORE FASTENING TO SUPPORTS	1:100
LONGITUDINAL BOW OF PANEL BEFORE FASTENING TO SUPPORTS	1:200
CUT-OUTS	1 INCREMENT

TABLE 3. LOADS ^{1.}		
USE OF GRATING	UDL ^{2.} kN/m ²	CONCENTRATED LINE LOAD (AT 1.0M CENTRES) kN
LIGHT DUTY ACCESS LIMITED TO ONE PERSON	3.0	1.0
GENERAL DUTY REGULAR TWO-WAY PEDESTRIAN TRAFFIC	5.0	1.0
HEAVY DUTY HIGH DENSITY PEDESTRIAN TRAFFIC	7.5	1.0 ^{3.}

1. LOADS ARE TO BE TAKEN TO BE SAFE WORKING LOADS FOR PERMISSIBLE STRESS DESIGN OR DEFLECTION LIMITATIONS.

2. THE UNIFORMLY DISTRIBUTED LOAD (UDL) IS THE EQUIVALENT UNIFORMLY DISTRIBUTED STATIC LOAD PER SQUARE METRE OF PLAN AREA.

3. GREATER CONCENTRATED LOADS MAY BE REQUIRED WHERE MACHINERY OR OTHER ITEMS ARE TO BE PLACED ON THE FLOORING.

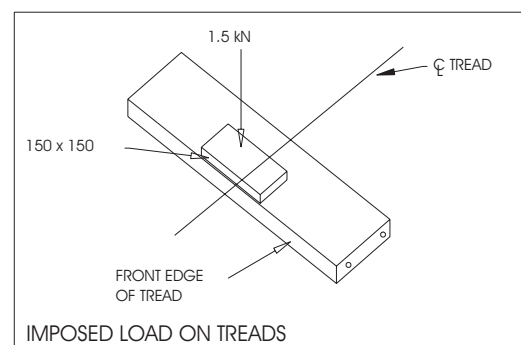
NOTE 1. GRATINGS REQUIRED TO TAKE GENERAL, HEAVY DUTY, VEHICLE OR SITE CONDITION LOADS (SEE 3 ABOVE) OR ANY OTHER TRAFFIC TRAVELLING AT 90 TO THE DIRECTION OF LOADBEARING BARS, I.E. ACROSS THE LOADBEARING BARS, SHALL HAVE TRANSVERSE BARS, THAT PASS THROUGH THE LOADBEARING BARS BELOW THE TOP OF THE GRATING, IN ORDER TO REDUCE THE TENDENCY FOR LOADBEARING BARS TO FLIP OVER UNDER LOADING, ACCELERATING OR BREAKING CONDITIONS ACROSS THE GRATING WIDTHS AND TO AVOID TRANSVERSE BARS LIFTING OR BREAKING LOOSE DUE TO STRESS OR WELD EMBRITTLMENT AT INTERSECTIONS.

NOTE 2. FOR VEHICULAR TRAFFIC, UNFACTORED WHEEL LOADS MAY HAVE THE PERMISSIBLE STRESS INCREASED BY 10% PROVIDING THERE IS A 25% INCREASE MADE TO THE UNFACTORED LOAD TO ALLOW FOR IMPACT.

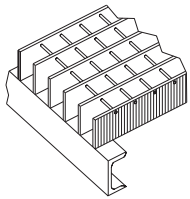
NOTE 3. GRATINGS SHOULD NOT UNDER ANY CIRCUMSTANCES BE DESIGNED AROUND LIMIT STATE PERAMETRES AS DEFLECTION AND STRESS LIMITATIONS DO NOT PERMIT THIS PRACTISE AND CATASTOPHIC COLLAPSE WILL OCCUR IF YIELD POINTS ARE SURPASSED UNINTENTIONALLY.

TABLE 4. LOAD FACTORS AND COMBINATIONS	
LOADING	FACTOR
DEAD LOAD	1.4
DEAD LOAD RESTRAINING UPLIFT OR OVERTURNING	1.0
IMPOSED LOAD	1.6

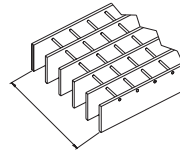
TABLE 5. ERECTION TOLERANCES	
BETWEEN PANELS	+10mm 1 TO 10



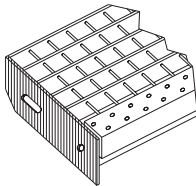
TERMINOLOGY



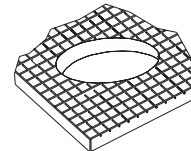
A. Load-Bearing Bar
A load-bearing member spanning between supports.



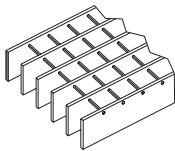
I. Width
The overall dimension of a flooring panel measured at right angles to the load-bearing bars.



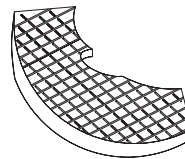
B. End Plate
A plate fixed to a stair or ladder tread for attaching to the stringer.



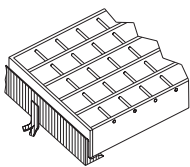
J. Cut-out
An area of flooring removed to permit pipes, columns, etc., to pass through or to clear obstructions.



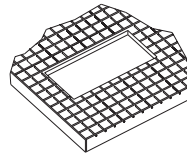
C. Transverse Bar
A member fixed at right angles to the load-bearing bars to provide lateral restraint.



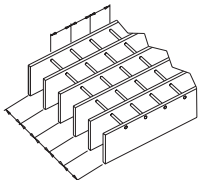
K. Curved Shaping
The part of a cut-out which is curved.



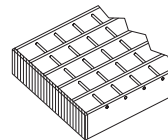
D. Curb Angle
A member fixed to concrete or supporting steelwork at the perimeter of a flooring area.



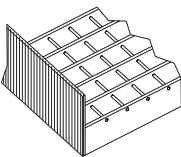
L. Straight Shaping
The part of cut-out which is straight.



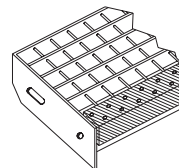
E. Pitch
The distance centre-to-centre of load-bearing bars or centres between points of lateral support to load-bearing bars.



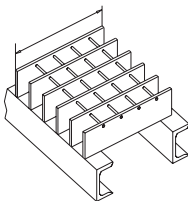
M. Binding Bar
A bar or section fixed to the edges of a flooring panel flush with the top of the load-bearing bar.



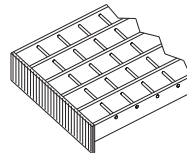
F. Kicking Plate (Toe Plate)
A flat bar around the edge of a flooring panel and projecting above the top of the load-bearing bars.



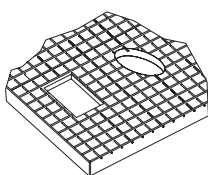
N. Front Edging Bar
A member attached to the front of a stair tread or to a flooring panel.



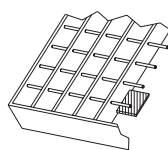
G. Length (Direction of span)
The overall dimension of a flooring panel parallel with the load-bearing bars.



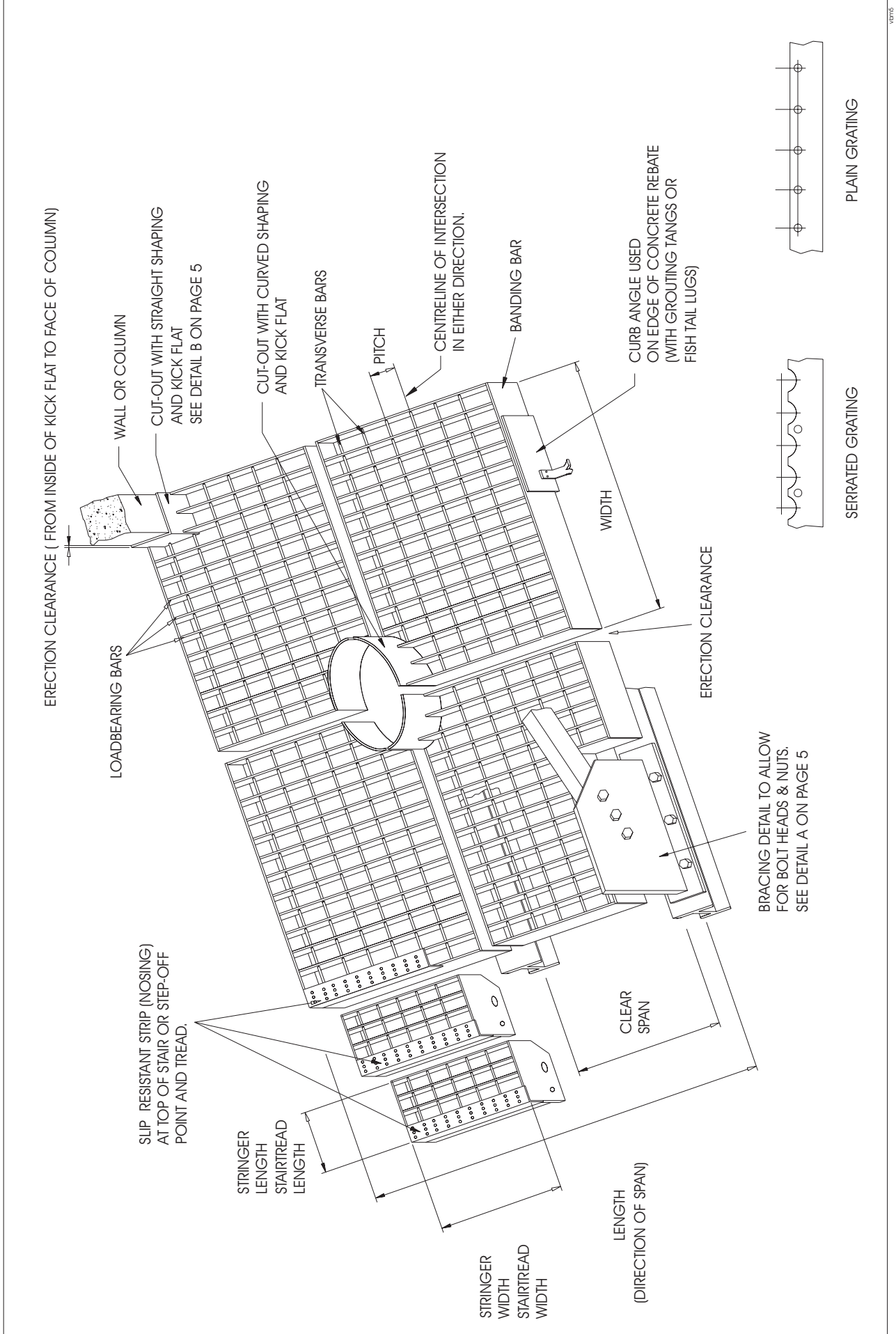
O. Deep Binding Bar
A bar or section fixed to the edges of a flooring panel and projecting below the underside.



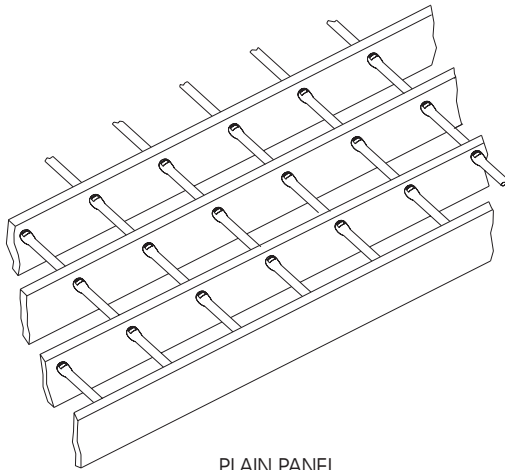
H. Net Area
The actual area of flooring excluding cut-out areas.
H. Gross Area
The total area of flooring including cut-out area.



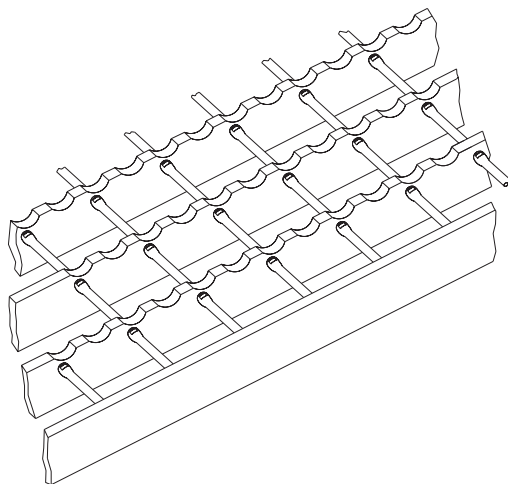
P. Hard Stamped Tag
A metal plate welded on tailored grating panels showing customer order number/drawing number and panel position number for easy erection at site.



VITAGRID GRATINGS



PLAIN PANEL



SERRATED PANEL

VITAGRID SERIES VE

 X
BEARERS AND MIN
8mm Ø SOLID
TRANSVERSE OR EQUIVALENT

BANDING

PANELS TO BE FULLY
BANDED U.O.N. WITH
EQUAL DEPTH
BEARER BARS ALL ROUND

KICK FLATS

 X K/FLAT
TO BE WELDED FLUSH
TO BOTTOM OF GRATINGS
WHERE SHOWN

FINISH

ALL GRATINGS TO BE

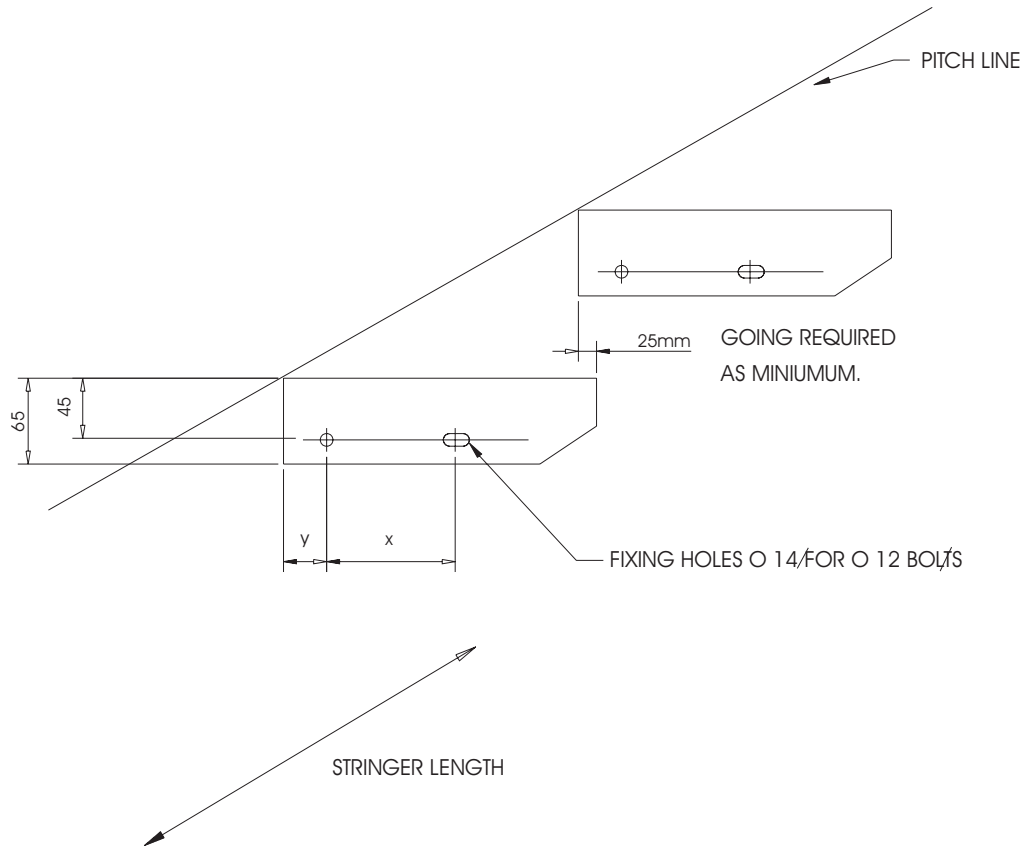
WELDING

ALL WELDING TO BE IN
ACCORDANCE WITH
AWS D1.1 PROCEDURES.

SERRATED SERIES

FOR SERRATED TYPE GRATING
SUFFIX GRATING TYPE WITH "Z"
e.i. VEZ

STAIRTREADS



RECOMMENDED BEARERS FOR WIDTHS OF TREADS

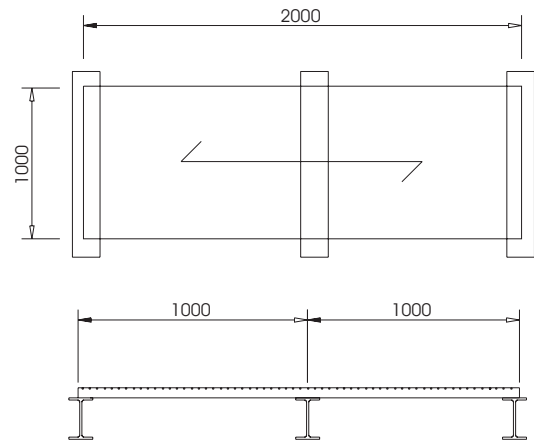
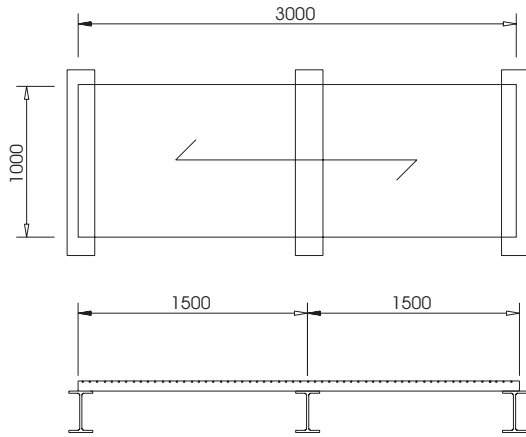
B/B		WIDTH	C.LOAD	MIN S/PLATE
25 x 4,5	2	750mm	977 kg	65 x 6mm
30 x 4,5	5	1000mm	1056 kg	65 x 6mm
40 x 4,5	8	1500mm	1162 kg	80 x 6mm

LENGTH OF TREAD mm	DIMENSION x mm	DIMENSION y mm
90	30	30
180	90	30
210	115	30
245	115/150	30
290	115/150	30
310	115/150	30

DESIGN RECOMMENDATIONS

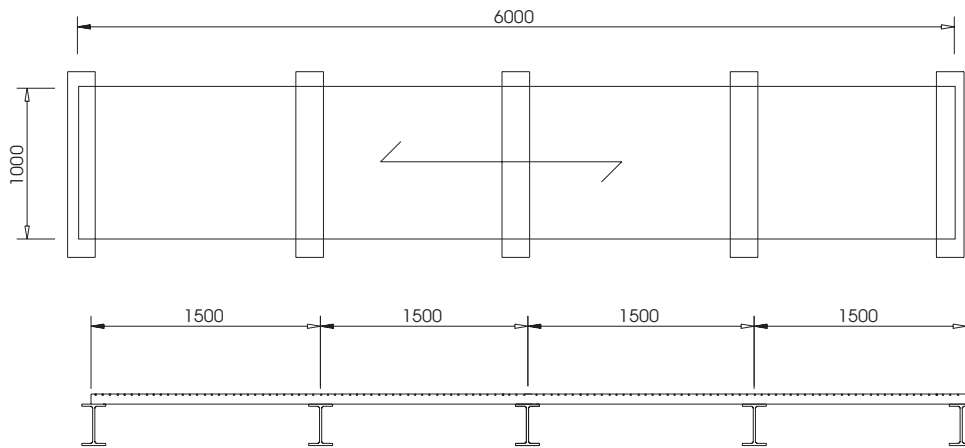
MODULAR DESIGN OFFERS QUICKER FABRICATION FROM STANDARDIZED SHEETS AND COST SAVINGS TO CLIENTS. MAX PANEL MASS AS SHOWN FOR FOLLOWING LOAD CATEGORIES.

IMPROVED LOAD TRANSMITTAL IS OBTAINED BY TRAVERSING MORE THAN ONE BEAM.



PANEL MASS	B/B TYPE	B/B	SERIES	LOAD/M ²	SPAN
90	2	25x4,5	VE	326	1500
104	5	30x4,5	VE	563	1500
143	8	40x4,5	VE	1334	1500

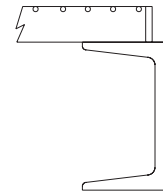
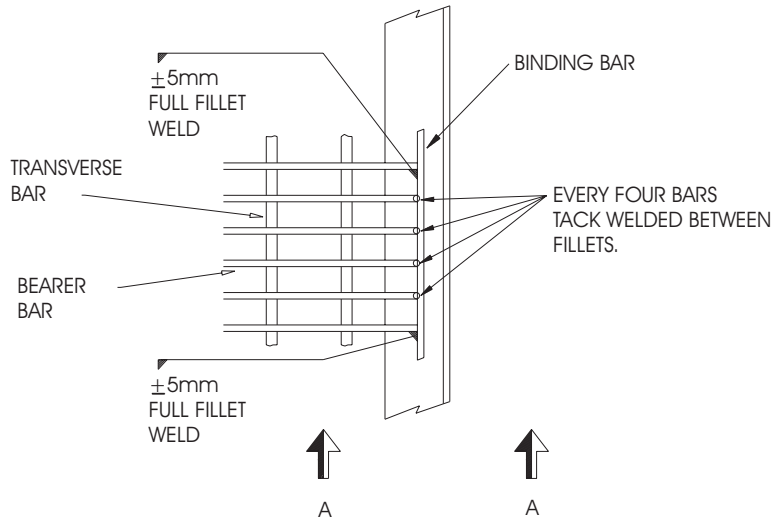
PANEL MASS	B/B TYPE	B/B	SERIES	LOAD/M ²	SPAN
60	2	25x4,5	VE	1098	1000
69	5	30x4,5	VE	1898	1000
95	8	40x4,5	VE	3754	1000



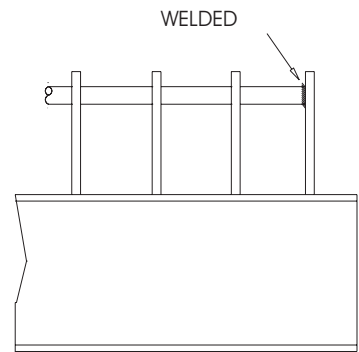
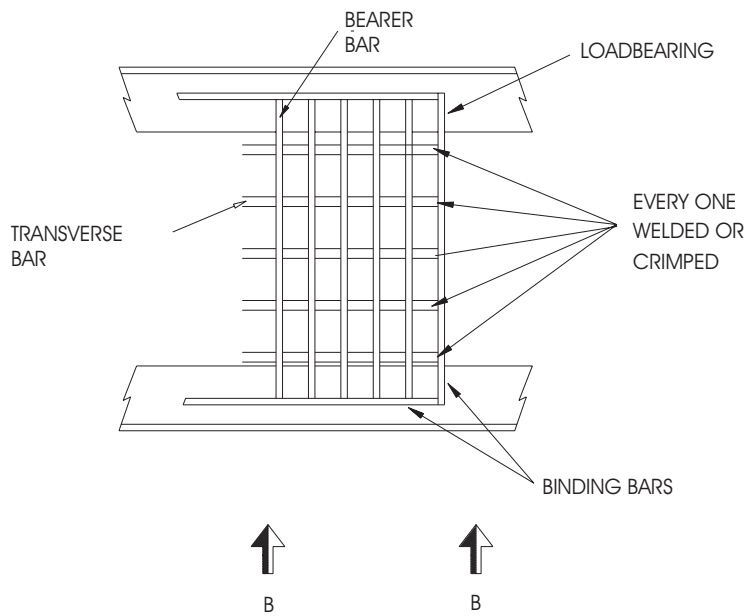
PANEL MASS	B/B TYPE	B/B	SERIES	LOAD/M ²	SPAN
181	2	25x4,5	VE	326	1500
208	5	30x4,5	VE	563	1500
286	8	40x4,5	VE	1334	1500

N.B. PANEL MASSES SHOWN ARE APPROXIMATE DEPENDANT ON FINISHES REQUIRED.
OVERALL PANEL SIZES ON SPANS INCLUDE FOR BANDING.

WELDING



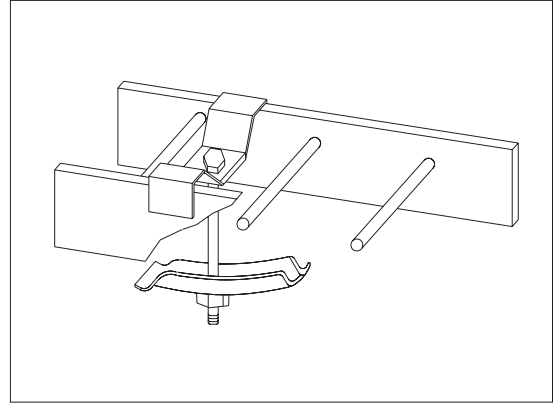
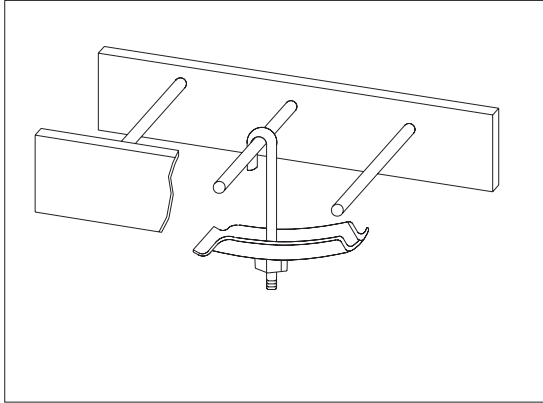
NON LOADBEARING



LOADBEARING

FIXINGS

NON VIBRATORY - FLAT SURFACES



VIBRATORY AND ANGLED SURFACES

4 FIXINGS MIN PER 2,0m (TYPICAL)

SADDLE CLAMP

STUD SHOT INTO STEELWORK

OR

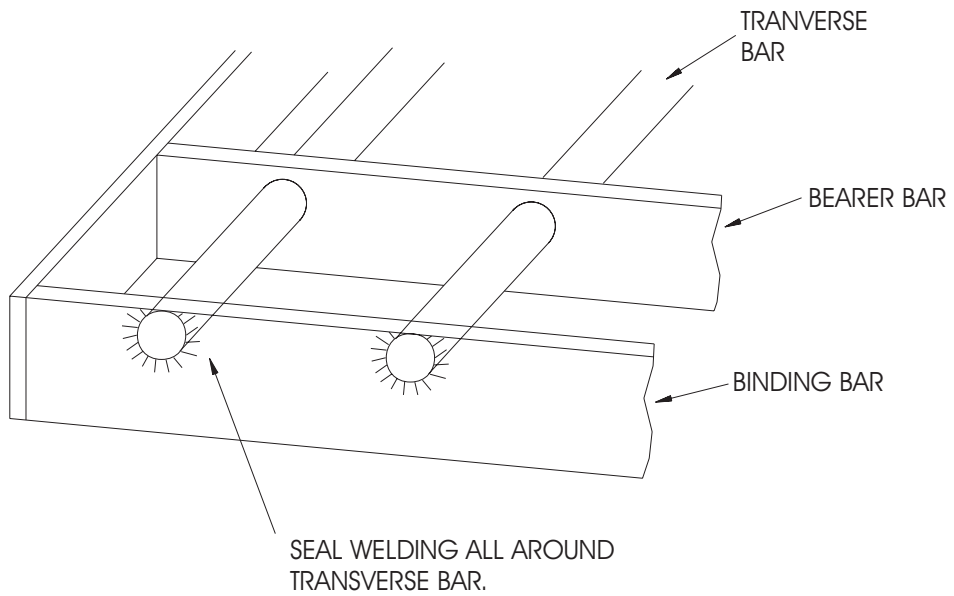
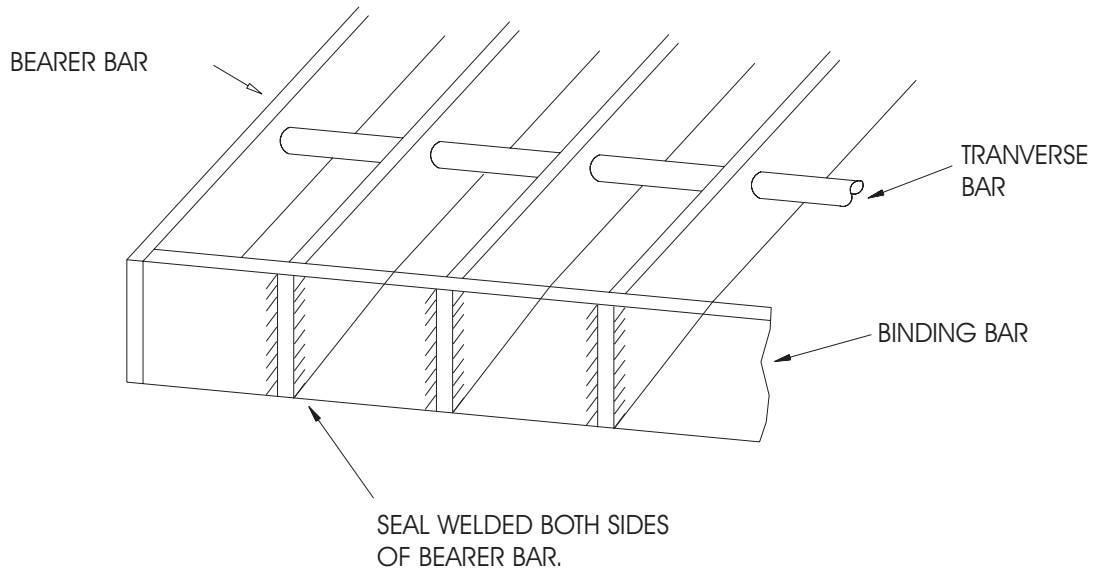
M8 SET SCREW FULLY THREADED

SCREW WELDED TO STEELWORK MIN FOUR SIDES.

MAX SUGGESTED DIAGONAL 16mm

B/B DEPTH	SCREW HEIGHTS
25	20
30	25
40	35
50	45

HIGH CORROSIVE AREAS



DRAINAGE BINDING BARS

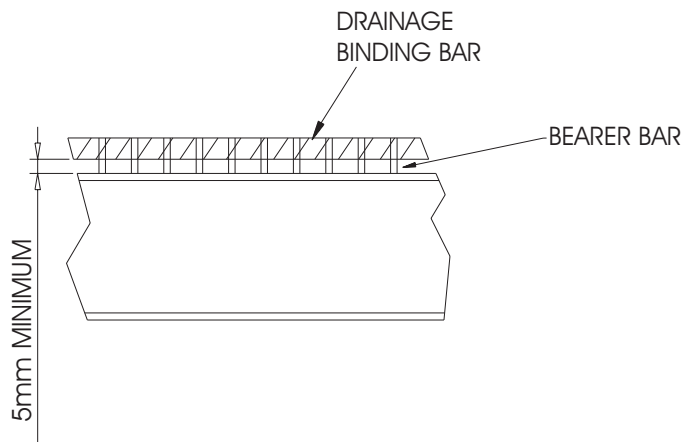
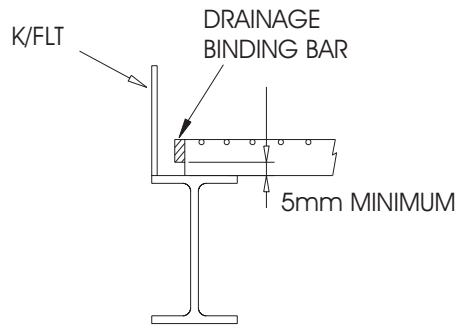
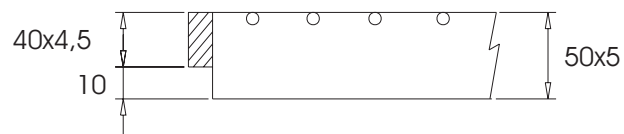
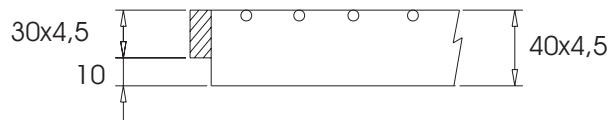
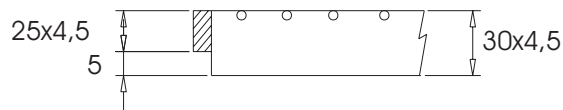
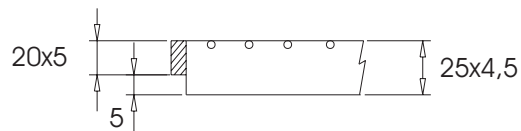
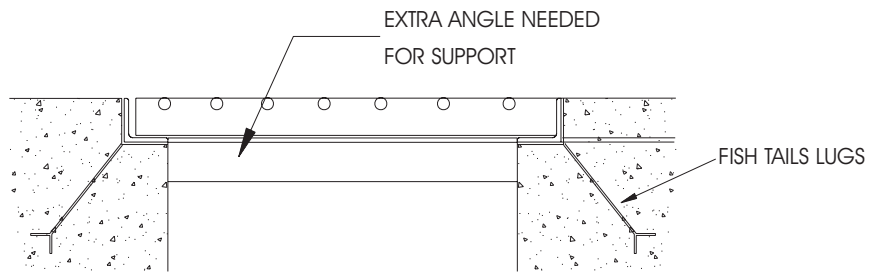
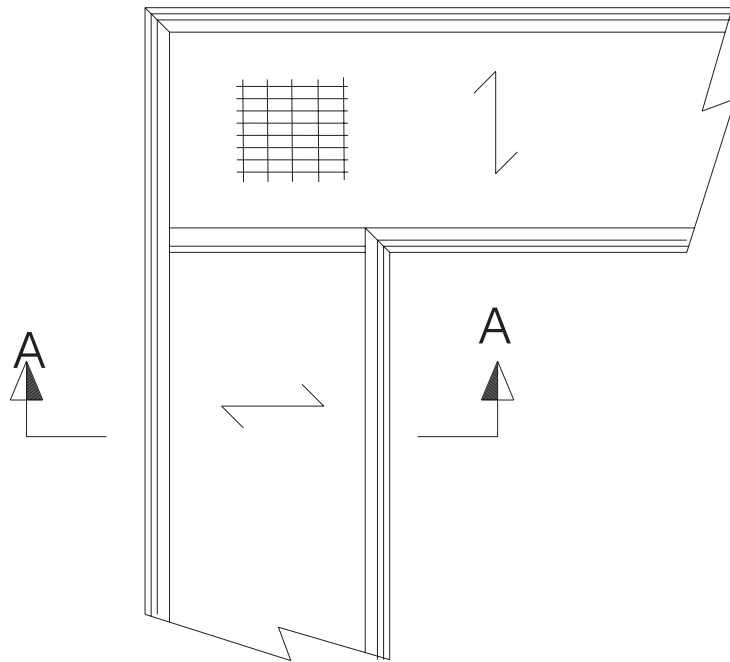


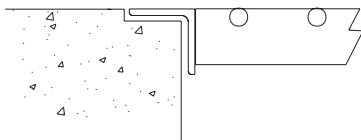
TABLE FOR SIZES



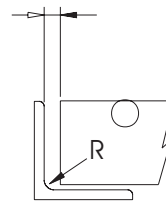
TRENCH COVERS



SECTION A-A



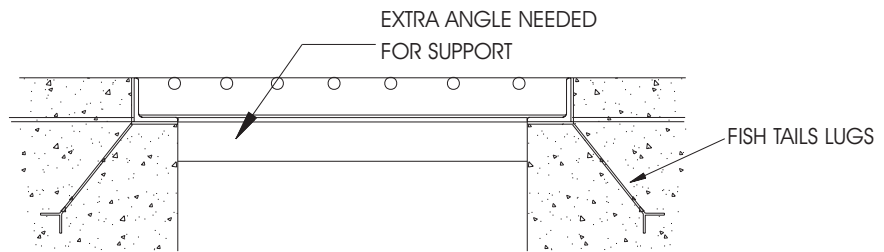
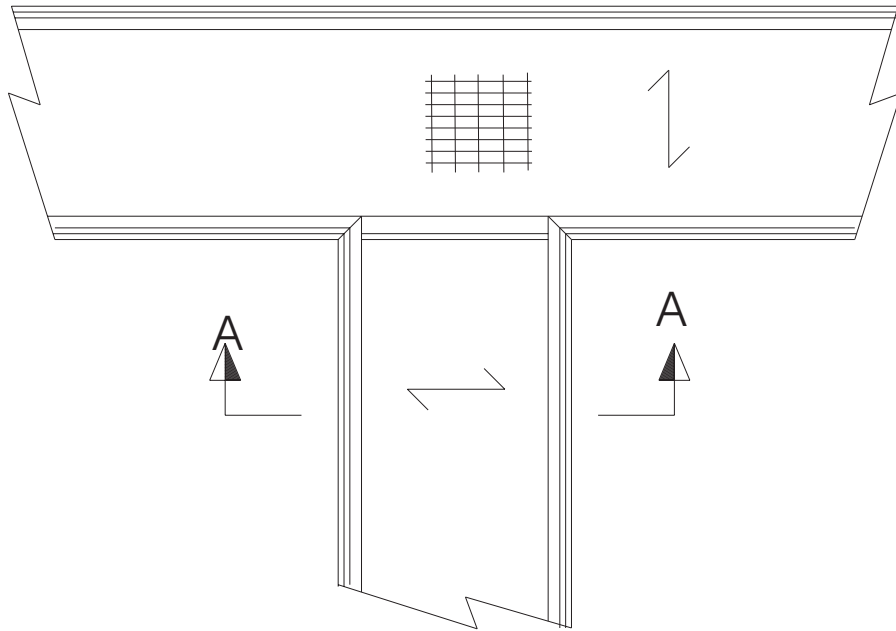
NOT RECOMMENDED



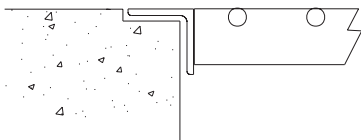
ALLOW SUFFICIENT CLEARANCE TO ENSURE RADIUS DOES NOT INTERFERE WITH SEATING.

RECOMMENDED

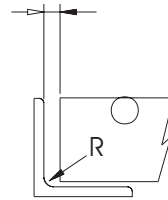
TRENCH COVERS



SECTION A-A



NOT RECOMMENDED

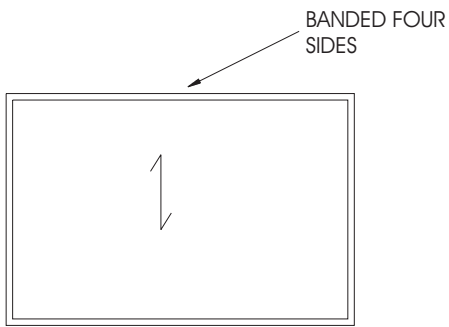


ALLOW SUFFICIENT CLEARANCE TO ENSURE RADIUS DOES NOT INTERFERE WITH SEATING.

RECOMMENDED

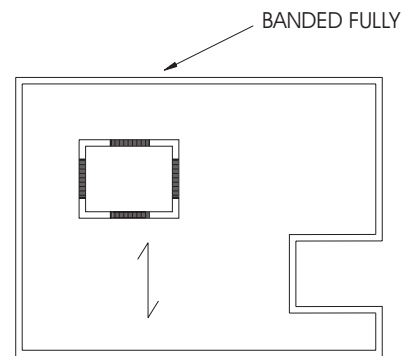
PANEL TYPES

TYPE A



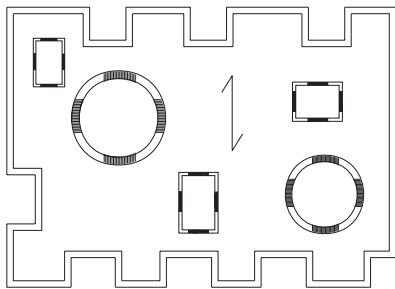
STRAIGHT - NO CUT-OUTS

TYPE B



STRAIGHT - RECTANGULAR CUT-OUTS

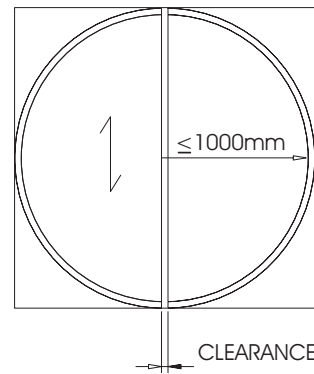
TYPE C



NOT SMALLER THAN 75mm RAD (150mm DIA)
IF A SMALLER HOLE IS REQ'D
MAKE IT SQUARE

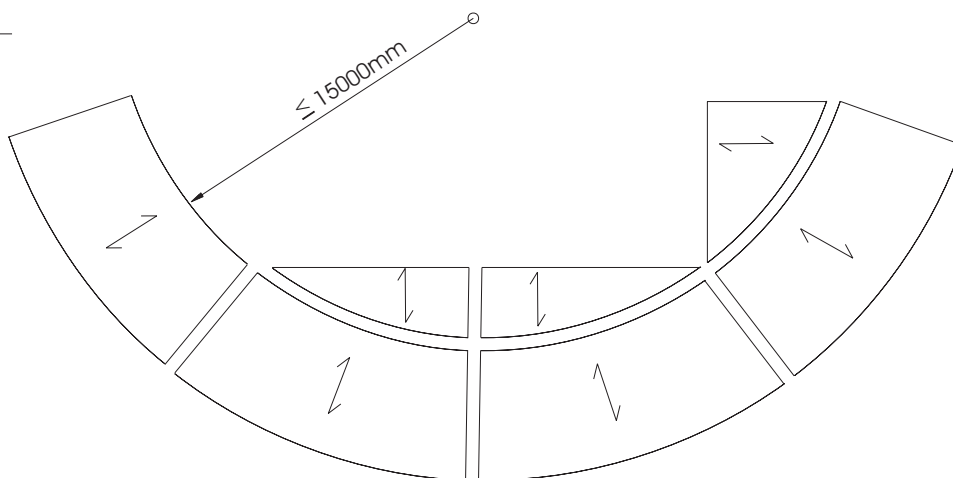
STRAIGHT - CIRCULAR CUT-OUTS
EXCESSIVE RECTANGULAR CUT-OUTS

TYPE D



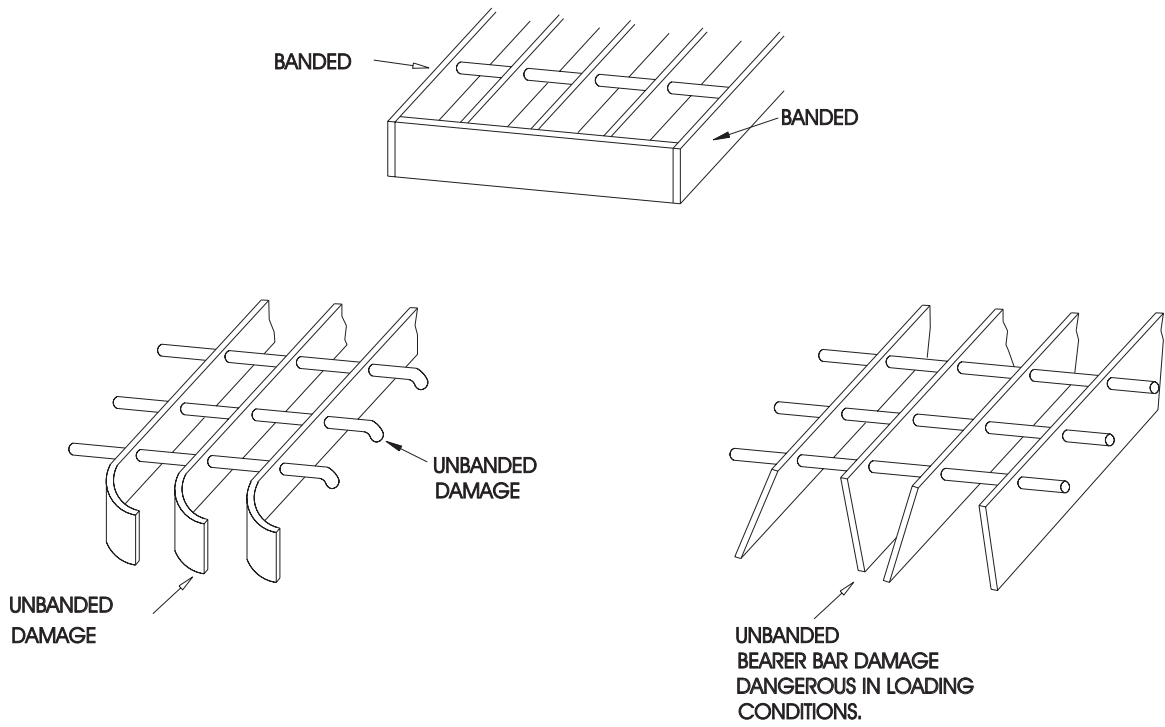
CIRCULAR PANEL

TYPE E

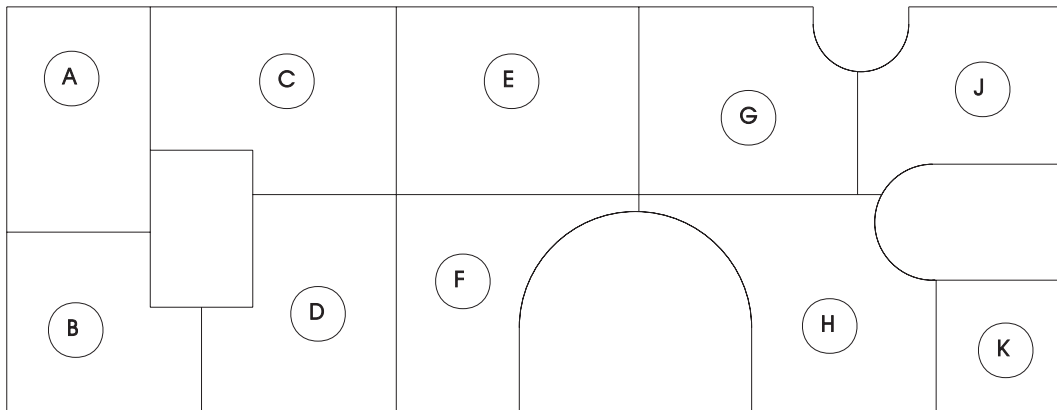


SEGMENTED PANELS

RECOMMENDATIONS



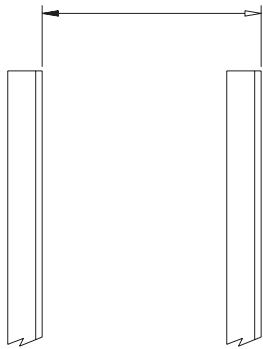
PANELS FULLY BANDED



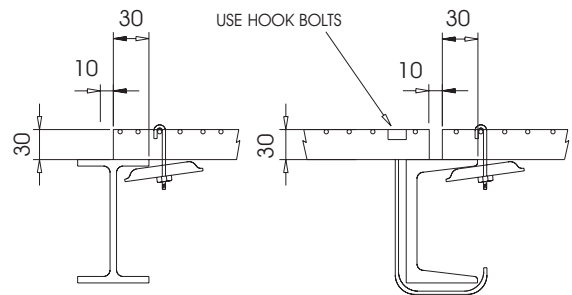
PRE TRIAL LAYOUTS AT MANUFACTURERS YARD
ENSURES CORRECT FIT AT SITE.

PRE TRIAL LAYOUT

RECOMMENDATIONS



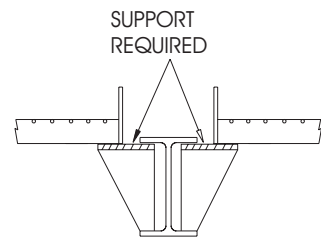
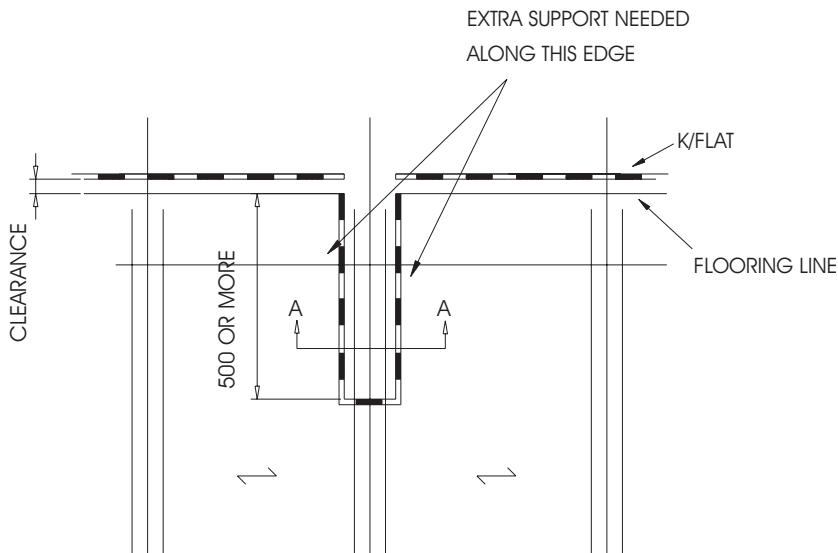
INDICATE WHICH IS HEEL OF CHANNEL.
 DIMENSION FROM HEEL TO HEEL.



PREFERRED STRUCTURAL SECTION FOR STANDARD FIXING CLIPS.

NON PREFERRED STRUCTURAL SECTION AS NON STANDARD FIXINGS MUST BE USED.

MINIMUM BEARING LENGTH SHOULD BE EQUAL TO THE DEPTH OF THE BEARING BAR MEMBER EXCLUDING TOLERANCE GAP.

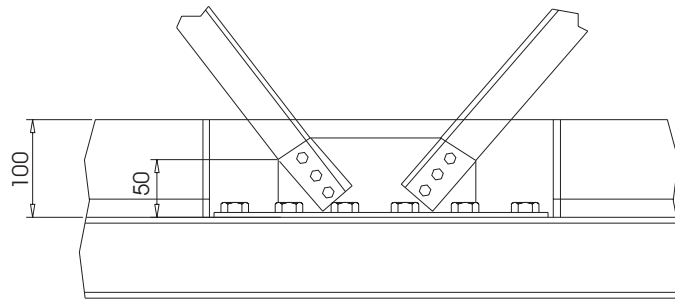
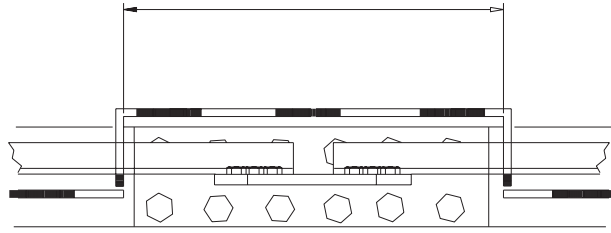


SECTION A-A

RECOMMENDED

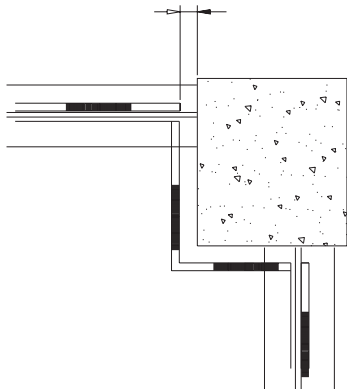
DETAILS OF PROBLEM AREAS

DIMENSION CUT-OUT TO CLEAR PLATE

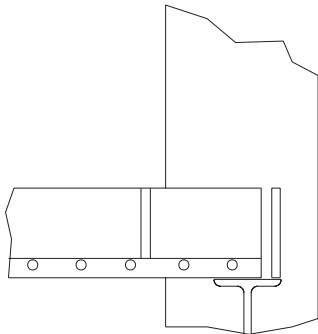
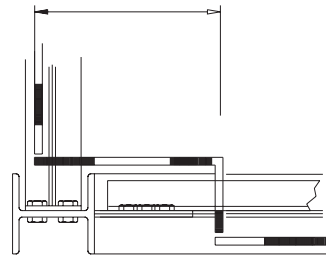


DETAIL A

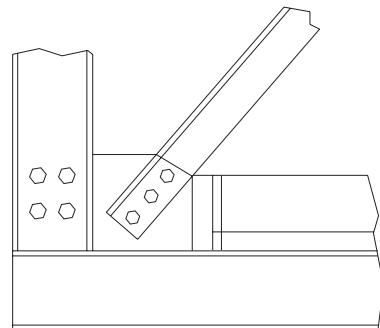
ALLOW SUFFICIENT CLEARANCE FOR CONCRETE VARIATIONS.



DIMENSION CUT-OUT MUST CLEAR BRACING, CLEATS AND BOLTS.

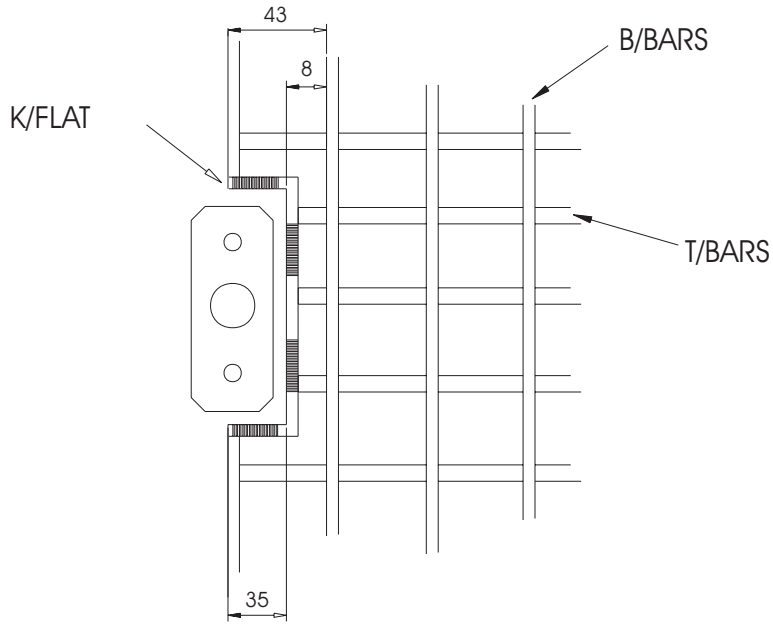


DETAIL B

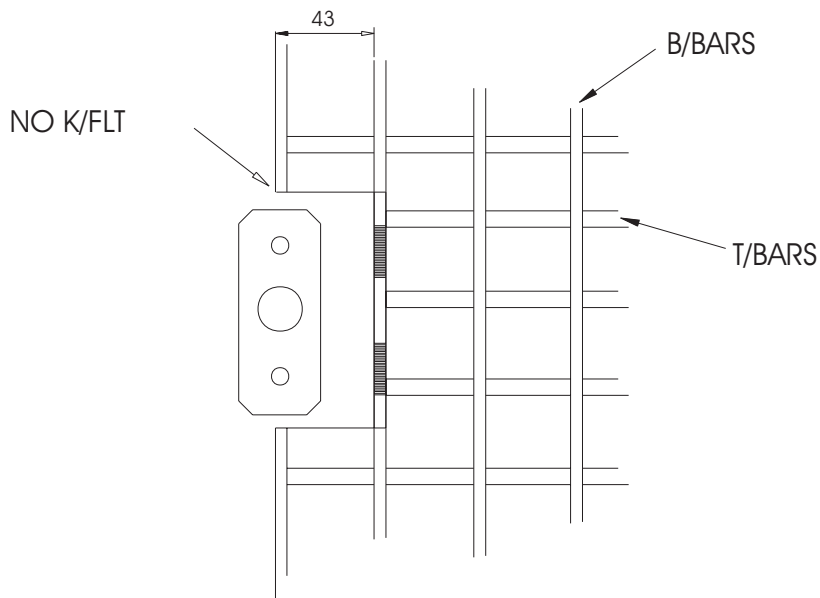


DETAIL C

CUT-OUT DETAILS

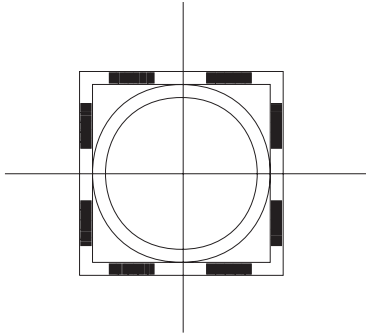


NOT RECOMMENDED

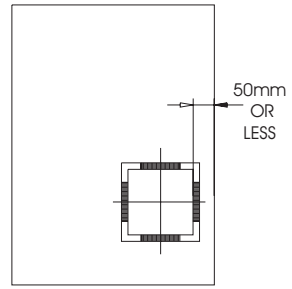


RECOMMENDED

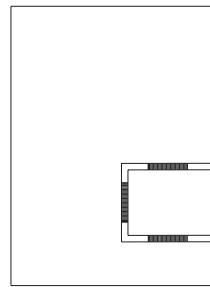
CUT-OUT DETAILS



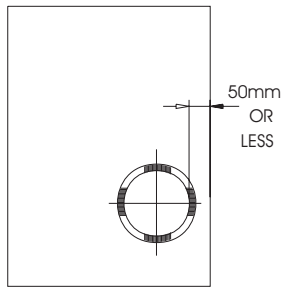
WHEN DIAMETER FOR CUTOUT IS LESS THAN 150 DIA CHANGE TO SQUARE.



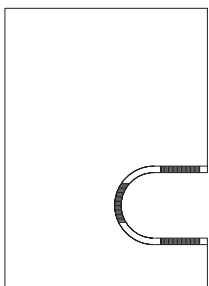
NOT RECOMMENDED



RECOMMENDED

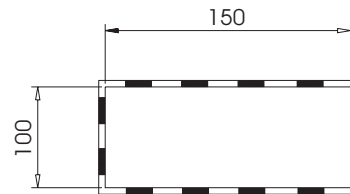
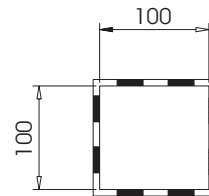


NOT RECOMMENDED



MIN RADIUS 75mm
OTHERWISE USE
SQUARE/RECTANGULAR
CUT-OUT.

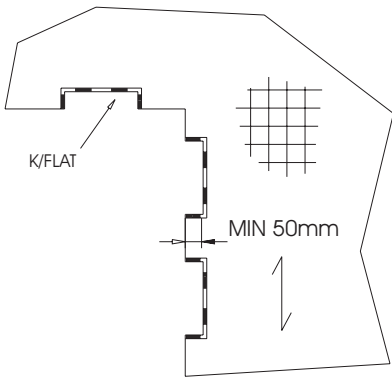
RECOMMENDED



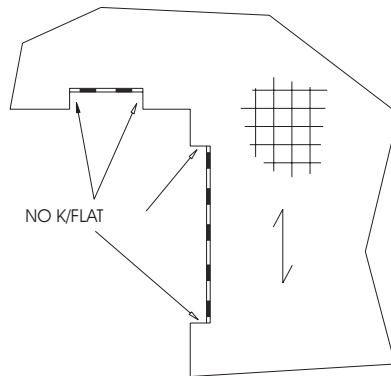
KICK FLAT RECOMMENDED IN
CUT-OUT GREATER THAN 150mm



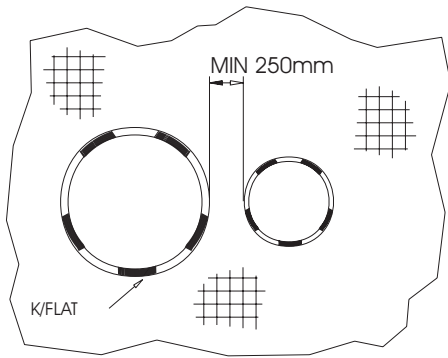
CUT-OUT DETAILS



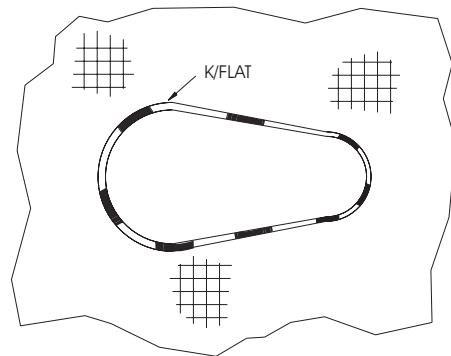
NOT RECOMMENDED



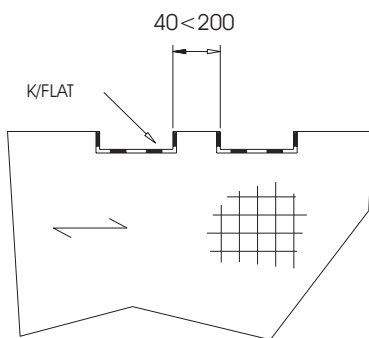
RECOMMENDED



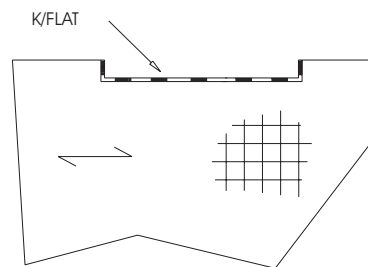
NOT RECOMMENDED



RECOMMENDED

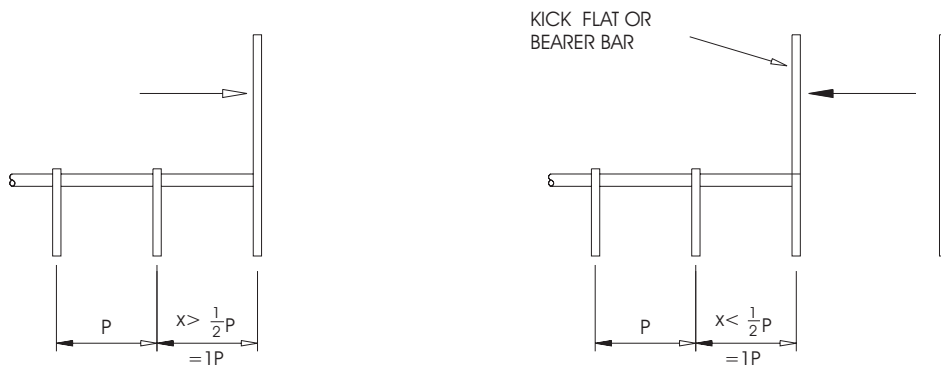


NOT RECOMMENDED

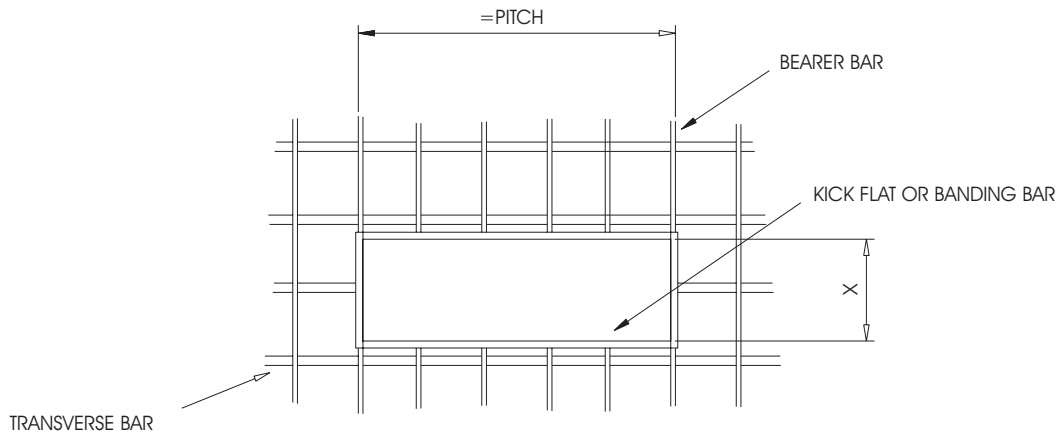


RECOMMENDED

SPECIAL CASE PITCH CUT BACKS

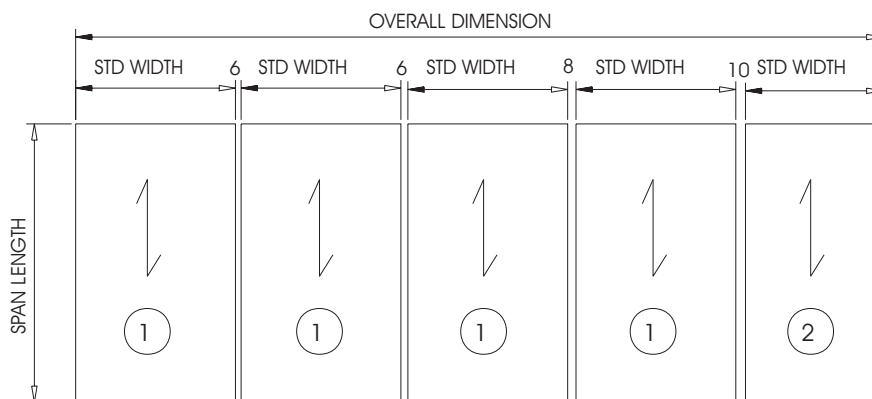


CUT-OUT DIRECTIVE



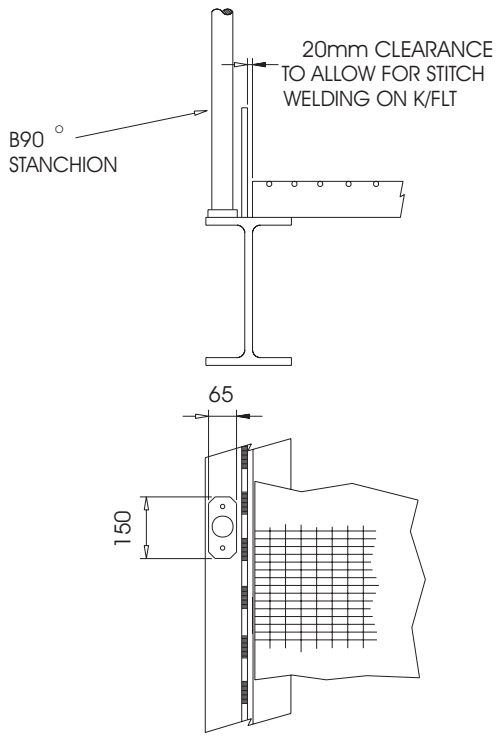
CUT-OUT TO NEXT INCREMENT PITCH ON B/BAR SIZE

TYPICAL PANEL LAYOUT

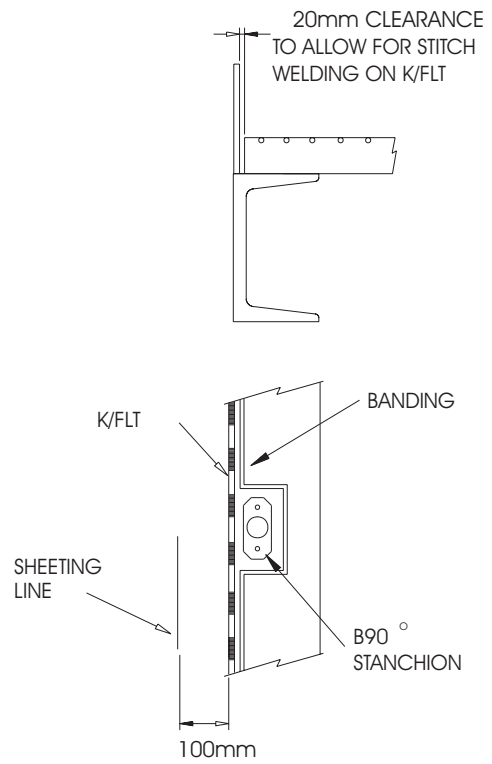


AREA WILL ALWAYS BE SUPPLIED IN STANDARD PANEL WIDTHS OF PARTICULAR GRATING,
 PLUS A MAKE UP PANEL ON THE END WITH THE WIDTH TAKEN TO THE NEAREST LOAD
 BAR TO MATCH OVERALL DIMENSION REQUIRED.

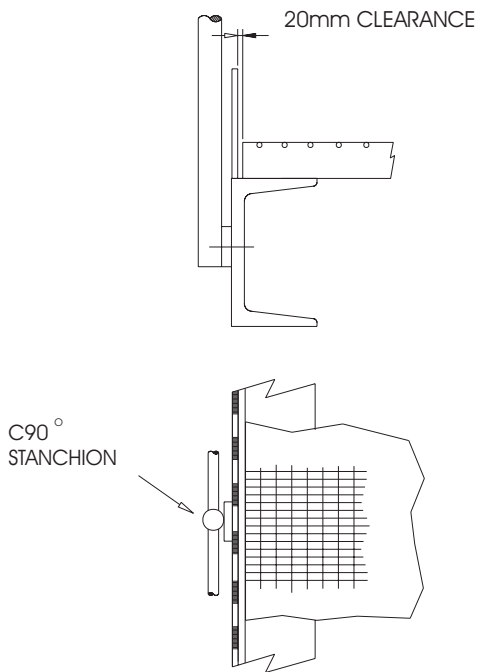
KICK FLATS GENERAL



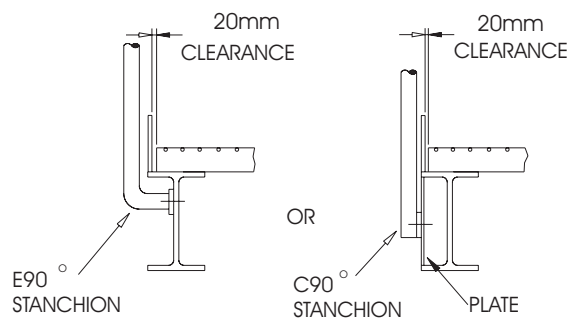
RECOMMENDED



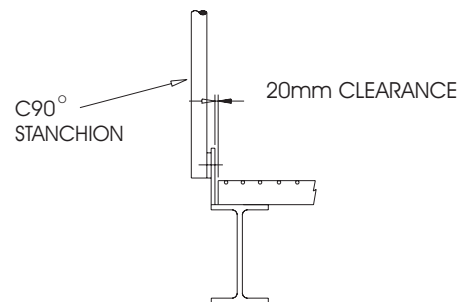
RECOMMENDED



RECOMMENDED

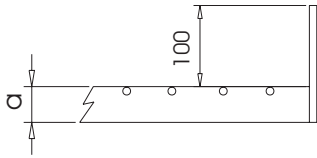


RECOMMENDED



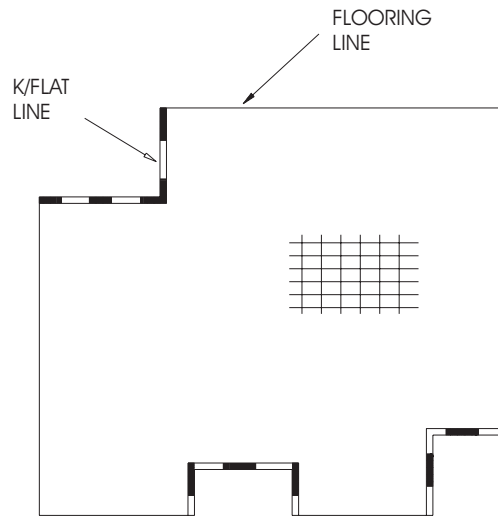
NOT RECOMMENDED

KICK FLATS GENERAL

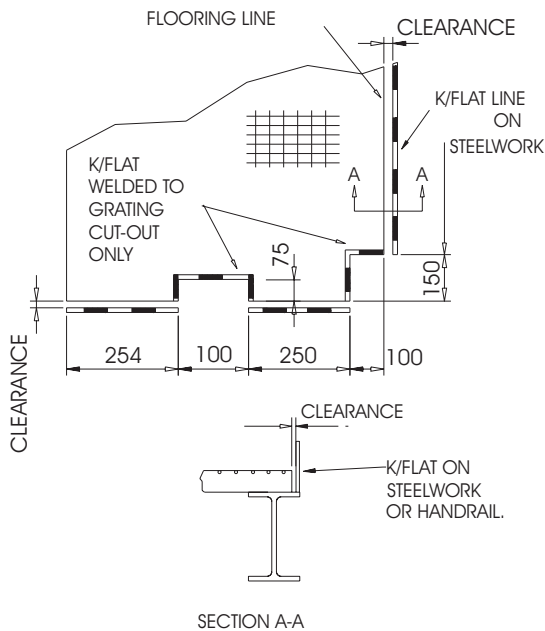


$a + 100\text{mm} = \text{K/FLAT HEIGHT}$

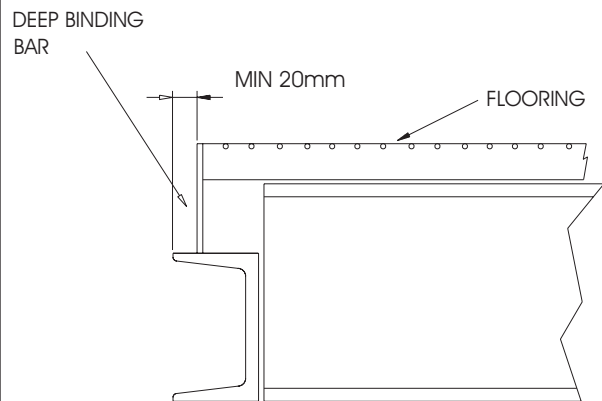
NOTE: ABOVE DETAIL SHOWS K/FLT NOT LESS THAN 100mm ABOVE FLOOR LEVEL AND FOR CANTER LEVER OR CUT-OUT SITUATIONS ONLY.



KICK FLATS MUST BE SHOWN CLEARLY WITH A DOUBLE LINE



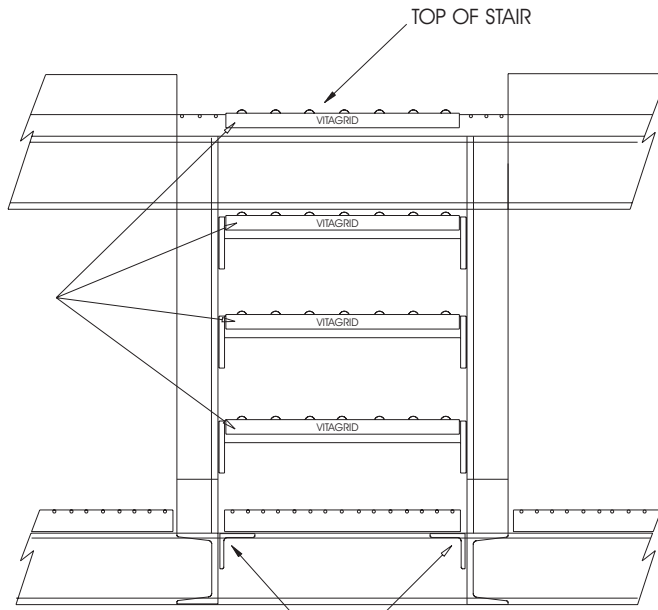
DIMENSIONS MUST BE TO THE OUTSIDE OF FLOORING LINE.



DEEP BINDING BAR FOR LEVEL DIFFERENCE OR STEPPED AREAS.
NOTE: EVERY BEARER BAR MUST BE FILLET WELDED ONE SIDE TO DEEP BINDING BAR.

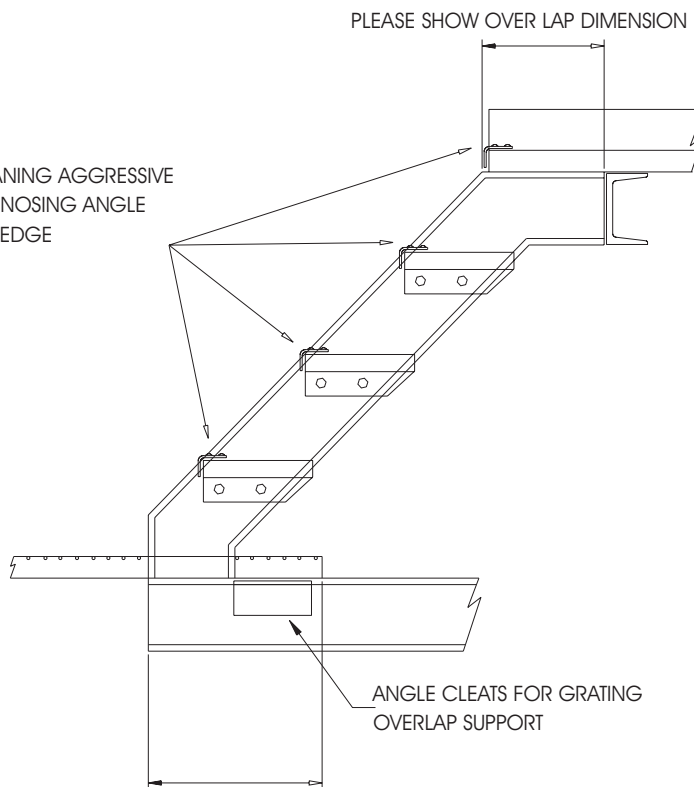
STAIR DETAILS

SELF CLEANING AGGRESSIVE
NON SLIP NOSING ANGLE
SIGHTING EDGE



NOTE: ANGLE CLEAT SUPPORT

SELF CLEANING AGGRESSIVE
NON SLIP NOSING ANGLE
SIGHTING EDGE

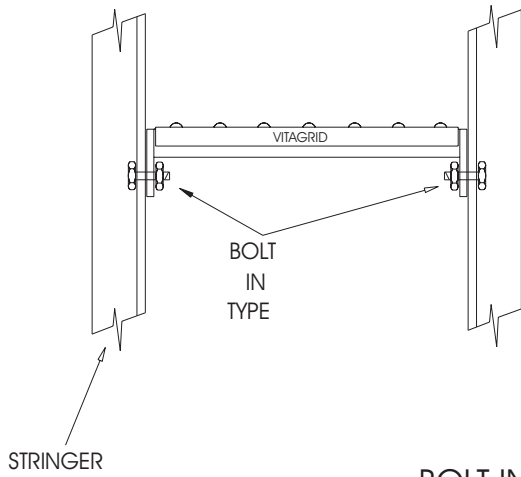


PLEASE SHOW OVER LAP DIMENSION

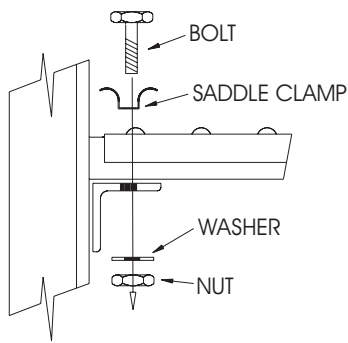
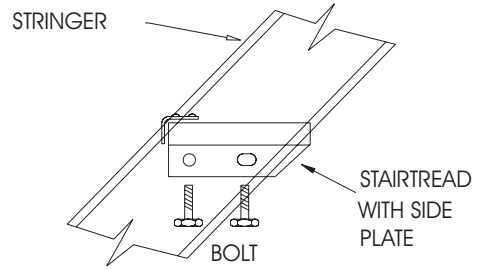
ANGLE CLEATS FOR GRATING
OVERLAP SUPPORT

PLEASE SHOW UNDER LAP DIMENSION

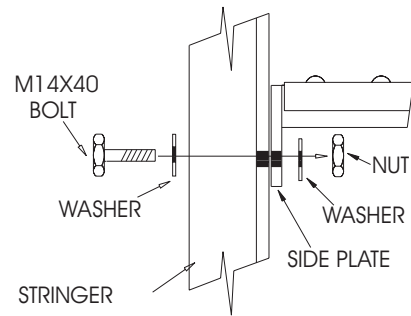
STAIRTREAD FIXINGS



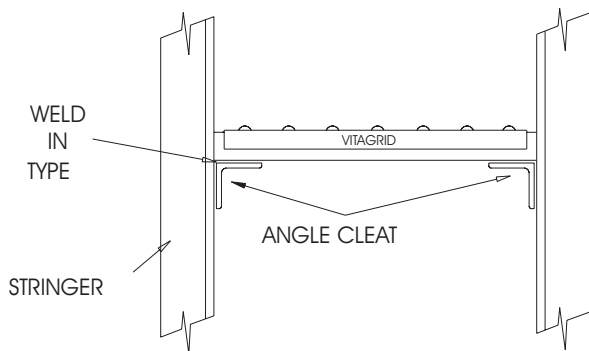
BOLT IN TYPE



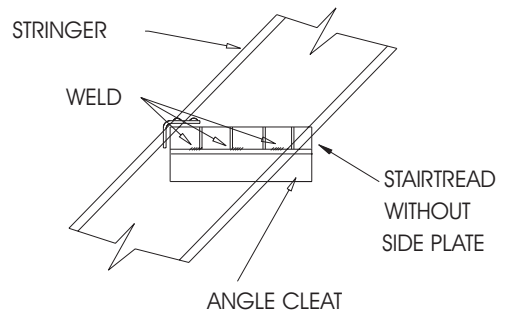
BOLT ON TYPE



BOLT IN TYPE



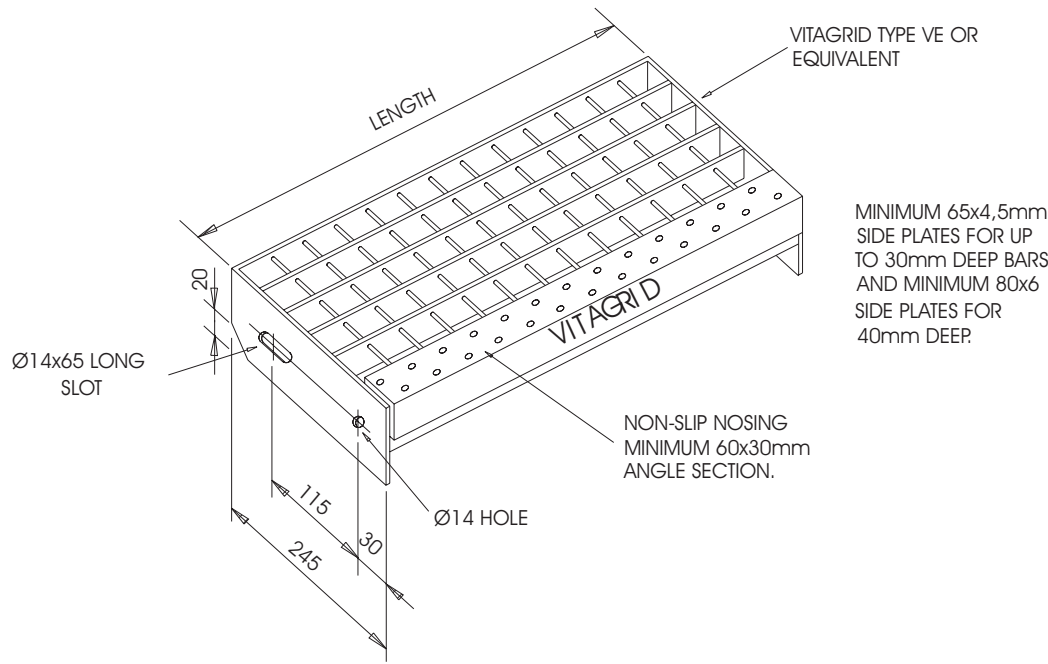
WELD IN TYPE



VITAGRID

STAIRTREAD SCHEDULE

DRAWING No.	STAIR No.	B/BARS	LOCATION	LENGTH AND QUANTITIES			
				1000	900	750	600
TOTAL							



	BY	DATE	TITLE	
DRAWN				JOB No.
CHECKED				SHEET OF
APPROVED			CUSTOMER	DRG. No. REV.

