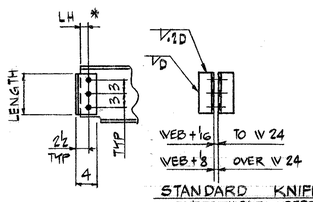


STANDARD HEADER ANGLE CONNECTIONS
ALLOWABLE STRESS DESIGN

BEAM DEPTH	BEAM WEB SHEAR CAPACITY (KIPS) WEB THICKNESS Fy=36 Fu=58							2-L 3x3x 5/16 STANDARD MARKS GAUGE OUTSTANDING LEG						BOLT CAP. S.S. (KIPS)	WELD CAP. KIPS		
	3/16	1/4	5/16	3/8	7/16	1/2	9/16	LENGTH	BOLT PER ROW	1/8	1 3/16	1 3/4	1 11/16	1 5/8		3/16	1/4	5/16
8 TO 12	(12·9) 18·1	(17·2) 24·1	(21·5) 30·1	(25·9) 36·2	(30·2) 42·2	(34·5) 48·2		5½	2	200a	200b	200c			42·1	26·9	35·8	44·8
12 TO 18	(20·5) 28·7	(27·4) 38·3	(34·2) 47·9	(41·1) 57·4	(47·9) 67·0	(54·7) 76·6		8½	2*	210a	210b	210c	210d		42·1	42·7	56·9	71·1
								8½	3	300a	300b	300c	300d		63·1	42·7	56·9	71·1
15 TO 24		(38·2) 53·4	(47·7) 66·8	(57·3) 80·1	(66·8) 93·5	(76·4) 107		11½	4	400a	400b	400c	400d	400f	84·2	59·4	79·4	99·1
18 TO 30		(49·4) 69·1	(61·8) 86·4	(74·1) 104	(86·5) 121	(98·8) 138		1'-2½	5	500a	500b	500c	500d	500f	105	76·8	102	127
21 TO 36			(75·4) 105	(90·5) 127	(106) 148	(121) 169		1'-5½	6		600b	600c	600d	600f	126	94·5	126	
24 TO 36				(108) 151	(126) 176	(144) 201		1'-8½	7		700b	700c	700d	700f	147	112	150	
30 TO 36				(125) 175	(146) 204	(167) 233	(188) 263	1'-11½	8		800b	800c	800d	800f	168	130	174	
33 TO 36					(166) 232	(190) 266	(214) 290	2'-2½	9			900c	900d	900f	189	147	196	
36					(186) 261	(213) 298	(240) 335	2'-5½	10			1000c	1000d	1000f	210	160	213	



STANDARD KNIFE CONNECTIONS
ALLOWABLE STRESS DESIGN

BEAM DEPTH	ANGLE LENGTH	STD MARK	ANGLE SIZE	BOLT CAPACITY (KIPS) D.S. NO OF BOLTS	FRICTION	WELD CAPACITY (KIPS) 3/16	1/4	5/16
8 TO 12	5½	20 kc	2-L 5 x 3 x 3/8	2	42·1	13·9	18·6	23·2
12 TO 18	8½	30 kc		3	63·1	29·3	39·0	48·8
15 TO 24	11½	40 kc		4	84·2	46·7	62·2	77·9
18 TO 30	1'-2½	50 kc		5	105	64·8	86·5	108
21 TO 36	1'-5½	60 kc	2-L 5 x 4 x 3/8	6	126	83·1	111	138
24 TO 36	1'-8½	70 kc		7	147	94	125	156
30 TO 36	1'-11½	80 kc		8	168	112	149	186
33 TO 36	2'-2½	90 kc	2-L 5 x 4 x 7/16	9	189	130	173	217
36	2'-5½	100 kc		10	210	148	197	247

BEAM WEB BEARING CAPACITY KIPS PER BOLT HOLE

MATERIAL		A36 Fu = 58 KSI					
BEAM WEB THICKNESS		3/16	1/4	5/16	3/8	7/16	1/2
EDGE DISTANCE LH	1¼"	6·80	9·06	11·3	13·6	15·9	18·1
	1½"	8·16	10·9	13·6	16·3	19·0	21·8
	*1¾"	9·52	12·7	15·9	19·0	22·2	
	2"	10·9	14·5	18·1	21·8		
		A572 GR50 & G40.21-44W Fu=65 ksi					
EDGE DISTANCE LH	1¼	7·62	10·2	12·7	15·2	17·8	20·3
	1½	9·14	12·2	15·2	18·3	21·3	
	*1¾	10·7	14·2	17·8	21·3		
	2	12·2	16·2	20·3	24·4		

* PREFFERED "EDGE DISTANCE"

BEARING CAPACITY OF STEEL VERSUS END DISTANCE ON BOLT
ALLOWABLE STRESS DESIGN

Fu = 65 ksi
A572 GRADE 50
G40.21 - 44W

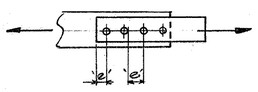
END DIST.	ALLOWABLE BEARING - KIPS PER BOLT HOLE MATERIAL THICKNESS (INCHES) 3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
1¼	7·62	10·2	12·7	15·2	17·8	20·3	22·9	25·4	27·9	30·5	33·0	35·6	38·1	40.6
1½	9·14	12·2	15·2	18·3	21·3	24·4	27·4	30·5	33·5	36·6	39·6	42·7		
1¾	10·7	14·2	17·8	21·3	24·9	28·4	32·0	35·5	39·1	42·7				
2	12·2	16·2	20·3	24·4	28·4	32·5	36·6	40·6						
2¼	13·7	18·3	22·9	27·4	32·0	36·6	41·1							
2⅜	14·5	19·5	24·1	28·9	33·8	38·6	43·4							
2½	15·2	20·3	25·4	30·5	35·5	40·6								
2⅝	16·0	21·3	26·7	32·0	37·3	42·7								
2¾	16·8	22·3	27·9	33·5	39·1	44·7								
3	18·3	24·4	30·5	36·6	42·7									

PERMISSIBLE RANGE OF END DIST. THAT MAY BE CONSIDERED EFFECTIVE: 1# BOLTS; ⅞ ϕ BOLTS

Fu = 58 ksi
A36

"e" DIST	ALLOWABLE BEARING - KIPS PER BOLT HOLE MATERIAL THICKNESS (INCHES) 3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
1¼	6.80	9.06	11·3	13·6	15·9	18·1	20·4	22·7	24·9	27·2	29·5	31·7	34·0	36·3
1½	8.16	10·9	13·6	16·3	19·0	21·8	24·5	27.2	29·9	32·6	35·3	38·1	40·8	
1¾	9·52	12·7	15·9	19·0	22·2	25·4	28·5	31·7	34·9	38·1	41·2			
2	10·9	14·5	18·1	21·8	25·4	29·0	32·6	36·3	39·9	43·5				
2¼	12·2	16·3	20·4	24·5	28·5	32·6	36·7	40·8						
2⅜	12·9	17·2	21·5	25·8	30·1	34·4	38·7	43.0						
2½	13·6	18·1	22·7	27·2	31·7	36·2	40·8							
2⅝	14·3	19·0	23·8	28·5	33·3	38·1	42·8							
2¾	15·0	19·9	24·9	29·9	34·9	39·9								
3	16·3	21·7	27·2	32·6	38·1	43·5								

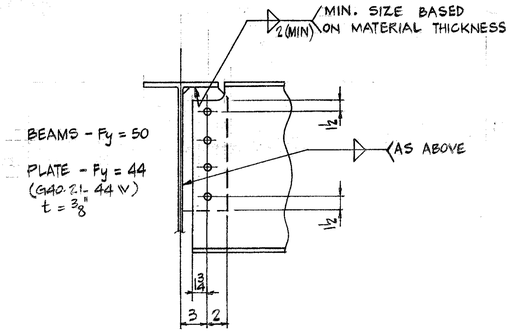
PERMISSIBLE RANGE OF END DIST. THAT MAY BE CONSIDERED EFFECTIVE: 1# BOLTS; ⅞ ϕ BOLTS

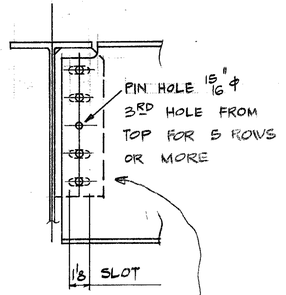


NOTE : END DISTANCE IN THE DIRECTION OF STRESS APPLIES TO BOTH SITUATIONS INDICATED BY DIMENSION 'e' SHOWN.

'e' FOR STD. HLS = ½ DIST OF BOLTS MINUS ½ OF BOLT DIAMETER OR CTR. OF LAST BOLT TO END OF PLATE.

'e' FOR OVERSIZE HLS = THE ABOVE MINUS ⅛.





ERECTOR TO INSTALL BOLTS FROM BEAM WEB SIDE, SO WASHERS ARE OVER SLOTTED HOLES IN FIN PL.

BEAM TO BEAM FIN PLATE CONNECTION

BEAM DEPTH	# BOLTS	BOLT CAPACITY
12 TO 14	3	18·4*
16	4	29·6
18	5	35·2
21 TO 30	6	44·9
24 TO 33	7	54·7
27 TO 36	8	64·2

*FOR W 12 x 14, t_w = ·200, CAPACITY = 17K

NOTES

BEAM WEB SHEAR CAPACITY BASED ON Fy=36 ksi OR Fy=50 ksi AS NOTED
⅞ ϕ A325 BOLTS - 15/16 ϕ HOLES FRICTION VALUE ARE BASED ON A CLEAN MILL SCALE NON - PAINTED SURFACE.
ALLOWABLE BOLT SINGLE SHEAR STRESS = 17·5 ksi
WELDING - E70 SERIES ELECTRODES

Apr. 24/85

REVISED
DATE ____ BY ____
DATE ____ BY ____
DATE ____ BY ____
DATE ____ BY ____
DATE ____ BY ____

OPEN HOLES ____
PAINT ____
ERECTED BY ____
FIELD PAINT ____
INSPECTION ____

STANDARD BEAM CONNECTIONS
7 WORLD TRADE CENTER
TISHMAN CONSTRUCTION CUSTOMER
EMERY ROTH & SONS P.C. ARCHITECT
IRWIN G. CANTOR P.C. ENGINEER

FRANKEL STEEL LIMITED
220 ATTWELL DRIVE UNIT 1 REXDALE, ONTARIO M9W 5B2

SQUAD
MADE BY I.J DATE DEC 84 CHKD. BY AS. DATE Dec 84

CONT. No. 84-15 SHEET 901