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MILITARY HANDBOOK

STRUCTURAL SHIPBUILDING DETAILS USING TEE STIFFENERS

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DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND

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Structural Shipbuilding Details Using Tee Stiffeners

1. This military standardization handbook was developed by the Naval Sea Systems Command, Department of the Navy in accordance with established procedures.

2. This publication was approved on 15 July 1985, for printing and inclusion in the military standardization handbook series.

3. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

This handbook provides a convenient procedure for the selection of a variety of structural details for use in the construction of combatant, special auxiliary and assault ships of the U.S. Navy. The specific guidance provided throughout this document reflects the general guidance provided in Drawings 805-2460264-B and 805-2878699-A. This handbook resolves ambiguities and eliminates subjective interpretations of the information presented in those drawings. As a result, this handbook replaces those drawings. Comments regarding the method of presentation and utility of the information contained herein are solicited.

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1. SCOPE

1.1 Purpose. This handbook contains algorithms for the calculation of characteristic dimensions of steel structural detail components using tee stiffeners in combatant, special auxiliary and assault ships of the U.S. Navy.

1.2 Structural details considered. The structural details considered in this handbook address the detail components required for ordinary intersections of T-shape section-plate combinations, structural tube and I-beam stanchions. They apply for guidance in determining scantlings of flat plating and structures subjected to water pressure loads. They do not apply to special structures such as side protection bulkheads and submarine structures.

1.3 Structural shapes considered. The structural shapes considered in this handbook represent those which are currently used in construction of U.S. Navy surface ships. The shapes considered in accordance with MIL-HDBK-264 have been limited to tee shapes (that is, channels and angles are excluded). The structural detail catalogs present unique structural detail pieces for application with standard rolled steel shapes. The algorithms presented can be used to generate special details for special application built-up sections.

1.4 Materials considered. The algorithms presented in this handbook have been derived from theoretical strength requirements and demonstrated empirical relationships based on cumulative shipbuilding experience with steel. Caution should be used in applying these algorithms to aluminum or stiffened panel structures of other materials.

2. REFERENCED DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this handbook to the extent specified herein.

STANDARDS

MILITARY

MIL-STD-22 - Welded Joint Design.
MIL-STD-1628 - Fillet Weld Size, Strength, and Efficiency Determination.

HANDBOOK

MILITARY

MIL-HDBK-264 - Properties of Steel Shapes and Plate-Beam Combination Used in Shipbuilding.

(Copies of standards and handbooks required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer).

3. DEFINITIONS

3.1 Definition of detail elements. The configuration of a structural detail is a function of:

(a) The geometry of intersecting structural components.
(b) The loads supported by each of the intersecting structural components.

The following definitions should be used when determining component applicability or deriving characteristic dimensions for special purpose structural details which are not specifically covered within this handbook.

3.1.1 Tangency brackets. Tangency brackets are used at the intersection of two members whose webs are in-line and whose flanges intersect at a shallow angle. A pair of tangency brackets (one on either side of the web) balances the reaction perpendicular to the flange which arises from an abrupt change in direction of the flange (see figure 4).

3.1.2 Toe brackets. Toe brackets are used at the intersection of two members whose webs are in-line and whose flanges are nearly perpendicular. A pair of toe brackets transmits the tension or compression force in a flange to a structural element (either plating or the web of the backing structure) in-line with the web (see figure 5).

3.1.3 In-line bracket. An in-line bracket's primary function is to provide continuity to a pair of intercostal flanges separated by a beam-plate combination (see figure 6).

3.1.4 Full chock. A full chock is used at the intersection of two members (or a member and plate) whose webs are approximately perpendicular and which lie on opposite sides of an intervening plate. This detail is not recommended practice but is unavoidable in certain situations. An example would be an irregular superstructure siding crossing a transverse on the weather deck (see figure 7).

3.1.5 Plate bracket. A plate bracket is used at the intersection of two members (or a plate and a member) whose webs are perpendicular and flanges are parallel. It differs from a full chock because the intersecting members do not lie on opposite sides of a plate; rather, one member passes through a cutout in the other (see figure 8).

3.1.6 Beam brackets. Beam brackets provide increased section modulus to resist peak bending moments which occur near the ends of fixed or semifixed beams (see figure 22).

3.1.7 Lug collar. A lug collar is used to attach the webs of two intersecting members. A lug collar is used to simplify details where shear is moderate and watertightness is not a requirement (see figure 9).

3.1.8 Lapped collar. A lapped collar is used to attach the webs of two intersecting members when one member passes through a cutout in the other. It is used where watertightness is required and shear loading is moderate (see figure 10).

3.1.9 Flush collar. A flush collar is identical in function to the lapped collar but requires neat fit of all dimensions. A flush collar is appropriate in a high shear environment where the eccentricity resulting from the lapped joint is unsatisfactory. This situation frequently arises when a stanchion is terminated on a bulkhead (see figure 11).

3.1.10 Intermediate lateral support (ILS). ILS members are used to stabilize long, unsupported spans of beam-plate combinations. Three approved means of providing ILS are:

(a) Rolled shape ILS with web inserts to stabilize the flange (see figure 13).
(b) ILS cut from plate (see figure 14).
(c) In-line bracket ILS (appropriate only if plating exceeds 30.6 pounds (0.75 inch)) (see figure 6).

3.1.11 Hull pad. A hull pad is used when a rolled shape terminates abruptly at a piece of plating. This detail is not considered to be recommended practice (see figure 12).

3.1.12 Stanchion details. Stanchion details are classified according to the type of stanchion member (that is, wide flange members versus structural tube) and continuity of the stanchion (that is, terminating or continuing). For further guidance on the design of stanchion details see section 3.6.

3.1.13 Flange inserts. Flange inserts are used to increase the landing area for certain stanchion details. See section 3.6 for further design guidance.

3.1.14 Web inserts. Web inserts are used at the intersection of two members whose webs are perpendicular. They support the flange of the deeper of the two intersecting members.

3.1.15 Cutouts. Cutouts must be provided whenever a structural member pierces another member or plate. The dimensions of a cutout are strictly a function of the cross-sectional properties of the piercing beam.

3.1.16 Snipes. Snipes are small cuts on corners of individual pieces to permit fit-up. Straight snipes are shown but semicircular ones are also used.

3.2 Definition of nomenclature for variables. Throughout this handbook, upper and lower case variables are used to distinguish between information derived within a set of algorithms and information input to a set of algorithms. Similarly, conventions regarding subscripts have been defined to provide consistency among similar details. These definitions and conventions are presented in appendix A. Algorithms are defined in section 3.5.

3.3 Definitions of characteristic dimensions of structural shapes. The characteristic dimensions of structural shapes are presented on figure 1, and defined as follows: Actual dimensions of all shapes considered in this handbook are presented in tables 1 through 4.

CHARACTERISTIC DIMENSIONS for T's and I-T's

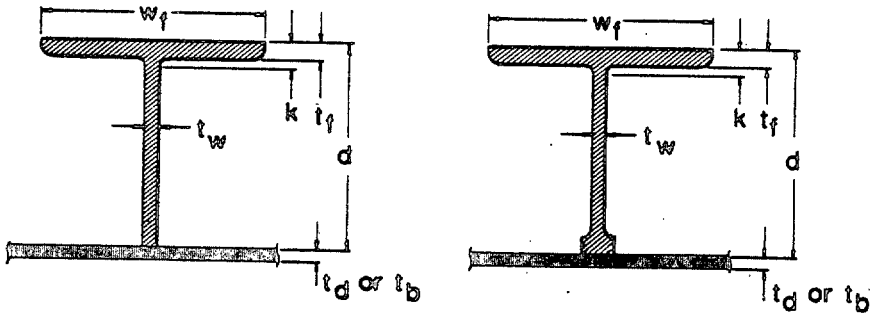

FIGURE 1a

CHARACTERISTIC DIMENSIONS for TUBE STANCHIONS

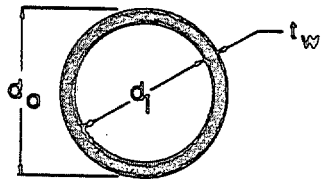

FIGURE 1b

CHARACTERISTIC DIMENSIONS for I-BEAMS and H-BEAMS

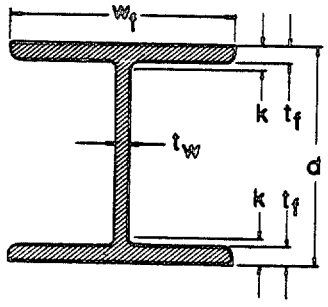

FIGURE 1c

SH 12956

FIGURE 1. Characteristic dimensions for T's and I-T's, tube stanchions, I-beams and H-beams.

TABLE I. Steel-structural shape catalog (I-T and T).

MEMBER ID	NOMINAL SIZE						D	TW	WF	TF	K
	IN	x	IN	x	LBS/FT		IN	IN	IN	IN	IN
1	4	x	4	x	5.0	T	3.95	0.170	3.94	0.205	0.625
2	4	x	4	x	6.5	T	4.00	0.230	4.00	0.255	0.688
3	4	x	4	x	7.5	T	4.06	0.245	4.02	0.315	0.750
4	4	x	5 1/4	x	9.0	T	4.07	0.230	5.25	0.330	0.750
5	4	x	4	x	13.0	I-T	4.16	0.280	4.08	0.345	0.688
6	5	x	4	x	6.0	T	4.94	0.190	3.98	0.210	0.625
7	5	x	4	x	7.5	T	5.00	0.230	4.00	0.270	0.688
8	5	x	4	x	8.5	T	5.06	0.240	4.01	0.330	0.750
9	5	x	4	x	9.5	T	5.12	0.250	4.02	0.395	0.813
10	5	x	5	x	16.0	I-T	5.01	0.240	5.00	0.360	0.750
11	5	x	5	x	19.0	I-T	5.15	0.270	5.03	0.430	0.813
12	6	x	4	x	7.0	T	5.96	0.200	3.97	0.225	0.688
13	6	x	4	x	7.0	T	6.00	0.220	3.99	0.265	0.750
14	6	x	4	x	9.0	I-T	5.90	0.170	3.94	0.215	0.563
15	6	x	4	x	9.5	T	6.08	0.235	4.01	0.350	0.813
16	6	x	4	x	11.0	T	6.16	0.260	4.03	0.425	0.875
17	6	x	4	x	12.0	I-T	6.03	0.230	4.00	0.280	0.625
18	6	x	6	x	15.0	I-T	5.99	0.230	5.99	0.260	0.625
19	6	x	4	x	16.0	I-T	6.28	0.260	4.03	0.405	0.750
20	6	x	6	x	20.0	I-T	6.20	0.260	6.02	0.365	0.750
21	7	x	5	x	11.0	T	6.87	0.230	5.00	0.335	0.875
22	7	x	5	x	13.0	T	6.96	0.255	5.03	0.420	0.938
23	7	x	6 3/4	x	15.0	T	6.92	0.270	6.73	0.385	0.938
24	7	x	6 3/4	x	17.0	T	6.99	0.285	6.75	0.455	0.938
25	7	x	6 3/4	x	19.0	T	7.05	0.310	6.77	0.515	1.063
26	7	x	8	x	21.5	T	6.83	0.305	8.00	0.530	1.313
27	7	x	8	x	24.0	T	6.90	0.340	8.03	0.595	1.375
28	8	x	4	x	10.0	I-T	7.89	0.170	3.94	0.205	0.625
29	8	x	4	x	13.0	I-T	7.99	0.230	4.00	0.255	0.688
30	8	x	5 1/2	x	13.0	T	7.85	0.250	5.50	0.345	1.063
31	8	x	4	x	15.0	I-T	8.11	0.245	4.02	0.315	0.750
32	8	x	5 1/2	x	15.5	T	7.94	0.275	5.53	0.440	1.125
33	8	x	5 1/4	x	18.0	I-T	8.14	0.230	5.25	0.330	0.750
34	8	x	7	x	18.0	T	7.93	0.295	6.99	0.430	1.125
35	8	x	7	x	20.0	T	8.01	0.305	7.00	0.505	1.188
36	8	x	5 1/4	x	21.0	I-T	8.28	0.250	5.27	0.400	0.813
37	8	x	7	x	22.5	T	8.07	0.345	7.04	0.565	1.250

TABLE I. Steel-structural shape catalog (I-T and T). - Continued

MEMBER ID	NOMINAL SIZE				D	TW	WF	TF	K
	IN	x	IN	LBS/FT		IN	IN	IN	IN	IN
38	8	x	6 1/4	x 24.0	I-T	7.93	0.245	6.50	0.400	0.875
39	8	x	7 1/8	x 25.0	T	8.13	0.380	7.07	0.630	1.313
40	8	x	6 1/2	x 28.0	I-T	8.06	0.285	6.54	0.465	0.988
41	8	x	7 1/8	x 28.5	T	8.22	0.430	7.12	0.715	0.938
42	8	x	8	x 31.0	I-T	8.00	0.285	8.00	0.435	0.938
43	9	x	6	x 17.5	T	8.85	0.300	6.00	0.425	1.125
44	9	x	6	x 20.0	T	8.95	0.315	6.02	0.525	1.188
45	10	x	4	x 12.0	I-T	9.87	0.190	3.96	0.210	0.625
46	10	x	4	x 15.0	I-T	9.99	0.230	4.00	0.270	0.688
47	10	x	4	x 17.0	I-T	10.11	0.240	4.01	0.330	0.750
48	10	x	4	x 19.0	I-T	10.24	0.250	4.02	0.395	0.813
49	10	x	5 3/4	x 22.0	I-T	10.17	0.240	5.75	0.360	0.750
50	10	x	5 3/4	x 26.0	I-T	10.33	0.260	5.77	0.440	0.875
51	10	x	5 3/4	x 30.0	I-T	10.47	0.300	5.81	0.510	0.938
52	10	x	8	x 33.0	I-T	9.73	0.290	7.96	0.435	1.063
53	10	x	8	x 39.0	I-T	9.92	0.315	7.99	0.530	1.125
54	10	x	8	x 45.0	I-T	10.10	0.350	8.02	0.620	1.250
55	12	x	4	x 14.0	I-T	11.91	0.200	3.97	0.225	0.688
56	12	x	4	x 16.0	I-T	11.99	0.220	3.99	0.265	0.750
57	12	x	4	x 19.0	I-T	12.16	0.235	4.01	0.350	0.813
58	12	x	4	x 22.0	I-T	12.31	0.260	4.03	0.425	0.875
59	12	x	6 1/2	x 26.0	I-T	12.22	0.230	6.49	0.380	0.875
60	12	x	6 1/2	x 30.0	I-T	12.34	0.260	6.52	0.440	0.938
61	12	x	6 1/2	x 35.0	I-T	12.50	0.300	6.58	0.520	1.000
62	12	x	8	x 40.0	I-T	11.94	0.295	8.01	0.515	1.250
63	12	x	8	x 45.0	I-T	12.06	0.335	8.05	0.575	1.250
64	12	x	8 1/8	x 50.0	I-T	12.19	0.370	8.08	0.640	1.375
65	12	x	10	x 53.0	I-T	12.06	0.345	10.00	0.575	1.250
66	12	x	10	x 58.0	I-T	12.19	0.360	10.01	0.640	1.375
67	14	x	5	x 22.0	I-T	13.74	0.230	5.00	0.335	0.875
68	14	x	5	x 26.0	I-T	13.91	0.255	5.03	0.420	0.938
69	14	x	6 3/4	x 30.0	I-T	13.84	0.270	6.73	0.385	0.938
70	14	x	6 3/4	x 34.0	I-T	13.98	0.285	6.75	0.455	1.000
71	14	x	6 3/4	x 38.0	I-T	14.10	0.310	6.77	0.515	1.063
72	14	x	8	x 43.0	I-T	13.66	0.305	8.00	0.530	1.313
73	14	x	8	x 48.0	I-T	13.79	0.340	8.03	0.595	1.375

TABLE I. Steel-structural shape catalog (I-T and T). - Continued

MEMBER ID	NOMINAL SIZE				D	TW	WF	TF	K
	IN	x	IN	x LBS/FT		IN	IN	IN	IN	IN
74	16	x	5 1/2	x 26.0	I-T	15.69	0.250	5.50	0.345	1.063
75	16	x	5 1/2	x 31.0	I-T	15.88	0.275	5.53	0.440	1.125
76	16	x	7	x 36.0	I-T	15.86	0.295	6.99	0.430	1.125
77	16	x	7	x 40.0	I-T	16.01	0.305	7.00	0.505	1.188
78	16	x	7	x 45.0	I-T	16.13	0.345	7.04	0.565	1.250
79	16	x	7 1/8	x 50.0	I-T	16.26	0.380	7.07	0.630	1.313
80	16	x	7 1/8	x 57.0	I-T	16.43	0.430	7.12	0.715	1.375
81	16	x	10 1/4	x 67.0	I-T	16.33	0.395	10.24	0.665	1.375
82	16	x	10 1/4	x 77.0	I-T	16.52	0.455	10.30	0.760	1.438
83	16	x	10 3/8	x 89.0	I-T	16.75	0.525	10.37	0.875	1.563
84	18	x	6	x 35.0	I-T	17.70	0.300	6.00	0.425	1.125
85	18	x	6	x 40.0	I-T	17.90	0.315	6.02	0.525	1.188
86	18	x	7 1/2	x 50.0	I-T	17.99	0.355	7.50	0.570	1.250
87	18	x	7 1/2	x 60.0	I-T	18.24	0.415	7.58	0.695	1.375
88	18	x	7 5/8	x 71.0	I-T	18.47	0.495	7.64	0.810	1.500
89	18	x	11 1/8	x 86.0	I-T	18.39	0.480	11.09	0.770	1.438
90	18	x	11 1/8	x 97.0	I-T	18.59	0.535	11.15	0.870	1.563
91	18	x	11 1/4	x 106.0	I-T	18.73	0.590	11.20	0.940	1.625
92	18	x	11 1/4	x 119.0	I-T	18.97	0.655	11.27	1.060	1.750
93	21	x	8 1/4	x 62.0	I-T	20.99	0.400	8.24	0.615	1.375
94	21	x	8 1/4	x 68.0	I-T	21.13	0.430	8.27	0.685	1.438
95	21	x	8 1/4	x 73.0	I-T	21.24	0.455	8.30	0.740	1.500
96	21	x	8 3/8	x 83.0	I-T	21.43	0.519	8.36	0.835	1.563
97	21	x	8 3/8	x 93.0	I-T	21.62	0.580	8.42	0.930	1.688
98	21	x	12 1/4	x 101.0	I-T	21.36	0.500	12.29	0.800	1.563
99	21	x	12 3/8	x 111.0	I-T	21.51	0.550	12.34	0.875	1.625
100	4	x	4	x 13.0	I	4.16	0.280	4.06	0.345	0.688
101	6	x	6	x 15.0	I	5.99	0.230	5.99	0.260	0.625
102	6	x	6	x 20.0	I	6.20	0.260	6.02	0.365	0.750
103	6	x	6	x 25.0	I	6.38	0.320	6.08	0.455	0.813
104	8	x	8	x 31.0	I	8.00	0.285	7.99	0.435	0.938
105	8	x	8	x 35.0	I	8.12	0.310	8.02	0.495	1.000
106	8	x	8	x 40.0	I	8.25	0.360	8.07	0.560	1.063
107	8	x	8	x 48.0	I	8.50	0.400	8.11	0.685	1.188
108	8	x	8	x 58.0	I	8.75	0.510	8.22	0.810	1.313
109	8	x	8	x 67.0	I	9.00	0.570	8.28	0.935	1.438

TABLE I. Steel-structural shape catalog (I-T and T). - Continued

MEMBER ID	NOMINAL SIZE				D	TW	WF	TF	K
	IN	x	IN	x LBS/FT	IN	IN	IN	IN	IN
110	10	x	10	x 49.0	I 9.98	0.340	10.00	0.560	1.188
111	10	x	10	x 54.0	I 10.09	0.370	10.03	0.615	1.250
112	10	x	10	x 60.0	I 10.22	0.420	10.08	0.680	1.313
113	10	x	10	x 68.0	I 10.40	0.470	10.13	0.770	1.375
114	10	x	10	x 77.0	I 10.60	0.530	10.19	0.870	1.500
115	10	x	10	x 88.0	I 10.84	0.605	10.27	0.990	1.625
116	10	x	10	x 100.0	I 11.10	0.680	10.34	1.120	1.750
117	10	x	10	x 112.0	I 11.36	0.755	10.41	1.250	1.875
118	12	x	12	x 65.0	I 12.12	0.390	12.00	0.605	1.313
119	12	x	12	x 72.0	I 12.25	0.430	12.04	0.670	1.375
120	12	x	12	x 79.0	I 12.38	0.470	12.08	0.735	1.438
121	12	x	12	x 87.0	I 12.53	0.515	12.13	0.810	1.500
122	12	x	12	x 96.0	I 12.71	0.550	12.16	0.900	1.625
123	12	x	12	x 106.0	I 12.89	0.610	12.22	0.990	1.688
124	12	x	12	x 120.0	I 13.12	0.710	12.32	1.105	1.813
125	12	x	12	x 136.0	I 13.41	0.790	12.40	1.250	1.938
126	12	x	12	x 152.0	I 13.71	0.870	12.48	1.400	2.125
127	12	x	12	x 170.0	I 14.03	0.960	12.57	1.560	2.250
128	12	x	12	x 190.0	I 14.38	1.060	12.67	1.735	2.438
129	12	x	12	x 210.0	I 14.71	1.180	12.79	1.900	2.625
130	14	x	14 1/2	x 90.0	I 14.02	0.440	14.52	0.710	1.375
131	14	x	14 1/2	x 99.0	I 14.16	0.485	14.57	0.780	1.438
132	14	x	14 1/2	x 109.0	I 14.32	0.525	14.61	0.860	1.563
133	14	x	14 1/2	x 120.0	I 14.48	0.590	14.67	0.940	1.625
134	14	x	14 1/2	x 132.0	I 14.66	0.645	14.73	1.030	1.688
135	14	x	16	x 145.0	I 14.78	0.680	15.50	1.090	1.750
136	14	x	16	x 159.0	I 14.98	0.745	15.57	1.190	1.875
137	14	x	16	x 176.0	I 15.22	0.830	15.65	1.310	2.000
138	14	x	16	x 193.0	I 15.48	0.890	15.71	1.440	2.125
139	14	x	16	x 211.0	I 15.72	0.980	15.80	1.560	2.250
140	14	x	16	x 233.0	I 16.04	1.070	15.89	1.720	2.375
141	14	x	16	x 257.0	I 16.38	1.175	16.00	1.890	2.563
142	14	x	16	x 283.0	I 16.74	1.290	16.11	2.070	2.750
143	14	x	16	x 311.0	I 17.12	1.410	16.23	2.260	2.938
144	14	x	16	x 342.0	I 17.54	1.540	16.36	2.470	3.125
145	14	x	16	x 370.0	I 17.92	1.655	16.48	2.660	3.313
146	14	x	16	x 398.0	I 18.29	1.770	16.59	2.845	3.500

TABLE I. Steel-structural shape catalog (I-T and T). - Continued

MEMBER ID	NOMINAL SIZE			D	TW	WF	TF	K
	IN x IN x LBS/FT			IN	IN	IN	IN	IN
147	14	x 16	x 426.0	I 18.67	1.875	16.70	3.035	3.880

TABLE II. Steel-structural shape catalog (standard weight pipe).

MEMBER ID	NOMINAL DIAMETER	OUTSIDE DIAMETER	INSIDE DIAMETER	WALL THICKNESS	WEIGHT PER FOOT
	IN	IN	IN	IN	LBS/FT
1	3	3.5000	3.0680	0.2160	7.58
2	3 1/2	4.0000	3.5480	0.2260	9.12
3	4	4.5000	4.0260	0.2370	10.80
4	5	5.5630	5.0470	0.2580	14.63
5	6	6.6250	5.9810	0.3220	21.70
6	8	8.6250	7.9810	0.3220	28.58
7	10	10.7500	10.0200	0.3650	40.52
8	12	12.7500	12.0000	0.3750	49.61

TABLE III. Steel-structural shape catalog (extra strong pipe).

MEMBER ID	NOMINAL DIAMETER	OUTSIDE DIAMETER	INSIDE DIAMETER	WALL THICKNESS	WEIGHT PER FOOT
	IN	IN	IN	IN	LBS/FT
9	3	3.5000	2.9000	0.3000	10.26
10	3 1/2	4.0000	3.3640	0.3180	12.52
11	4	4.5000	3.8260	0.3370	15.00
12	5	5.5630	4.8130	0.3750	20.80
13	6	6.6250	5.7610	0.4320	28.60
14	8	8.6250	7.6250	0.5000	43.43
15	10	10.7500	9.7500	0.5000	54.79
16	12	12.7500	11.7500	0.5000	65.48

TABLE IV. Steel-structural shape catalog (double extra strong pipe).

MEMBER ID	NOMINAL DIAMETER	OUTSIDE DIAMETER	INSIDE DIAMETER	WALL THICKNESS	WEIGHT PER FOOT
	IN	IN	IN	IN	LBS/FT
17	3	3.5000	2.3000	0.6000	18.60
18	4	4.5000	3.1520	0.6740	27.57
19	5	5.5630	4.0630	0.7500	38.59
20	6	6.6250	4.8970	0.8640	53.21
21	8	8.6250	6.8750	0.8750	72.49

Ts, I-T and I-Beams

- d - Depth of member
- k - Distance from outer face of flange to point of tangency of the rolled fillet on web
- t_f - Thickness of flange
- t_w - Thickness of web
- w_f - Width of flange

Tube

- d_i - Inside diameter
- d_o - Outside diameter
- t_w - Wall thickness

3.4 Definitions of characteristic dimensions of detail elements. Characteristic dimensions for various detail elements are defined on figures 2 and 3.

3.5 Definition of an algorithm. An algorithm is a collection of equations which define the characteristic dimensions of a specific structural detail. Portions of an algorithm can be conditional based on the geometry of the members involved.

3.6 Design guidance for stanchion details. Guidance for the design of stanchion details for both wide flange and tube sections are specified in 3.6.1 through 3.6.4.

3.6.1 The detail for wide flange section terminating on intersecting T or I-T sections must provide a means of transferring the tension and compression loads from the stanchion flanges into the web of one of the intersecting members and from the web of stanchion into the web of the other intersecting member. This is accomplished by:

(a) Alining the web of the stanchion with the web of the deeper intersecting member.
(b) Providing a stanchion bracket which alines with the web of the shallower intersecting member and is perpendicular to the web of the stanchion. This bracket provides a load path to transfer load from the stanchion flange through the stanchion web to the web of the shallower intersecting member.
(c) Providing a stanchion chock against which the stanchion bracket terminates. This member provides an additional load path from the stanchion flange to the stanchion bracket and web of the shallower member.
(d) Provide a cap or sole plate to increase the stiffness and bearing area of the flange of the deeper member. In certain situations, a cap or sole plate replaces the flange to simplify fabrication procedures. Where used in conjunction with the flange of the deeper intersecting member, the consequences of delamination must be addressed.

3.6.2 The detail for a continuing I-beam stanchion provides continuity to the intercostal stanchion flanges separated by the beam-plate combination. In certain situations, in-line brackets can be used to provide this continuity.

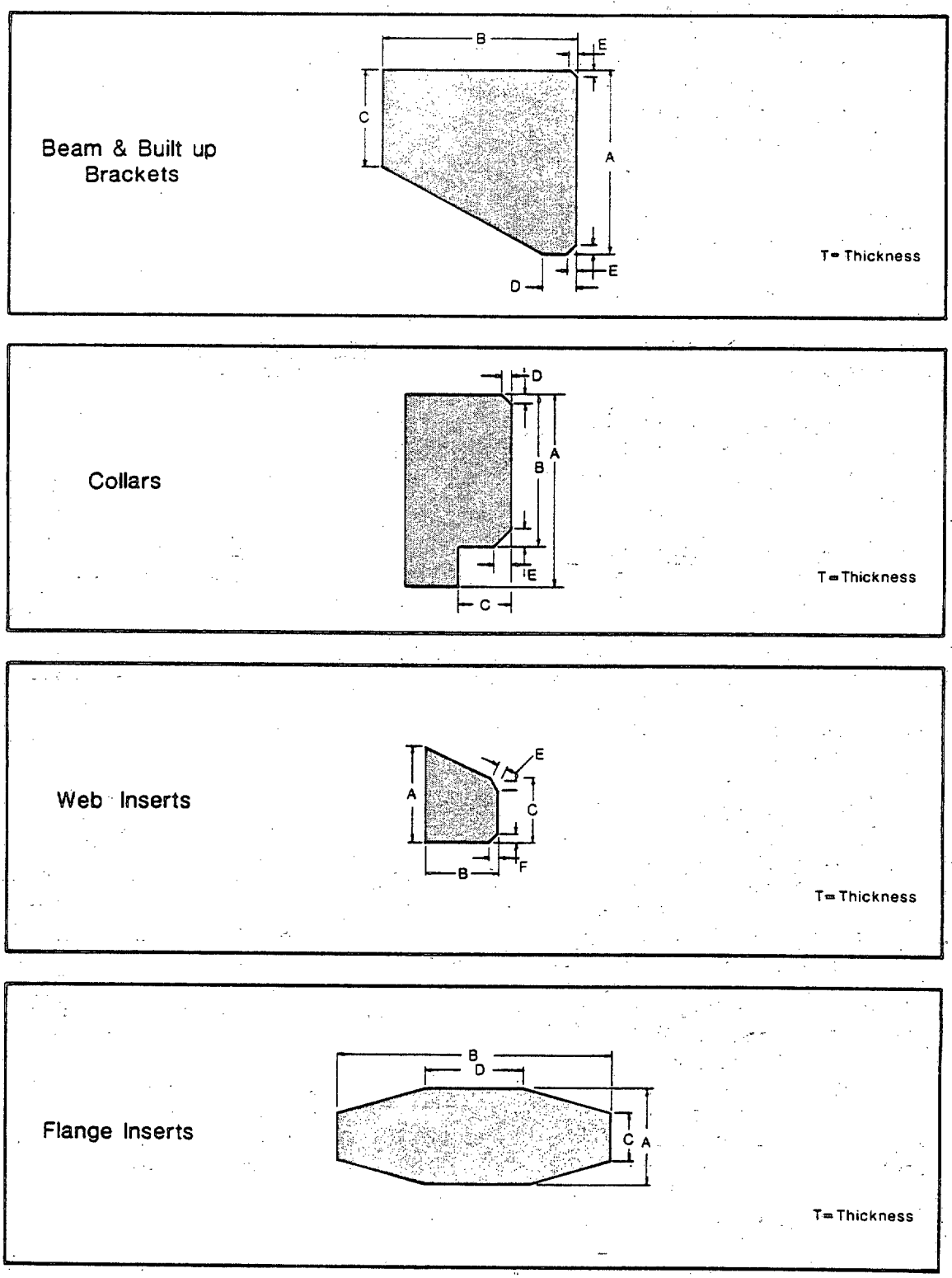

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FIGURE 2. Generalized dimensions for brackets, collars and inserts.

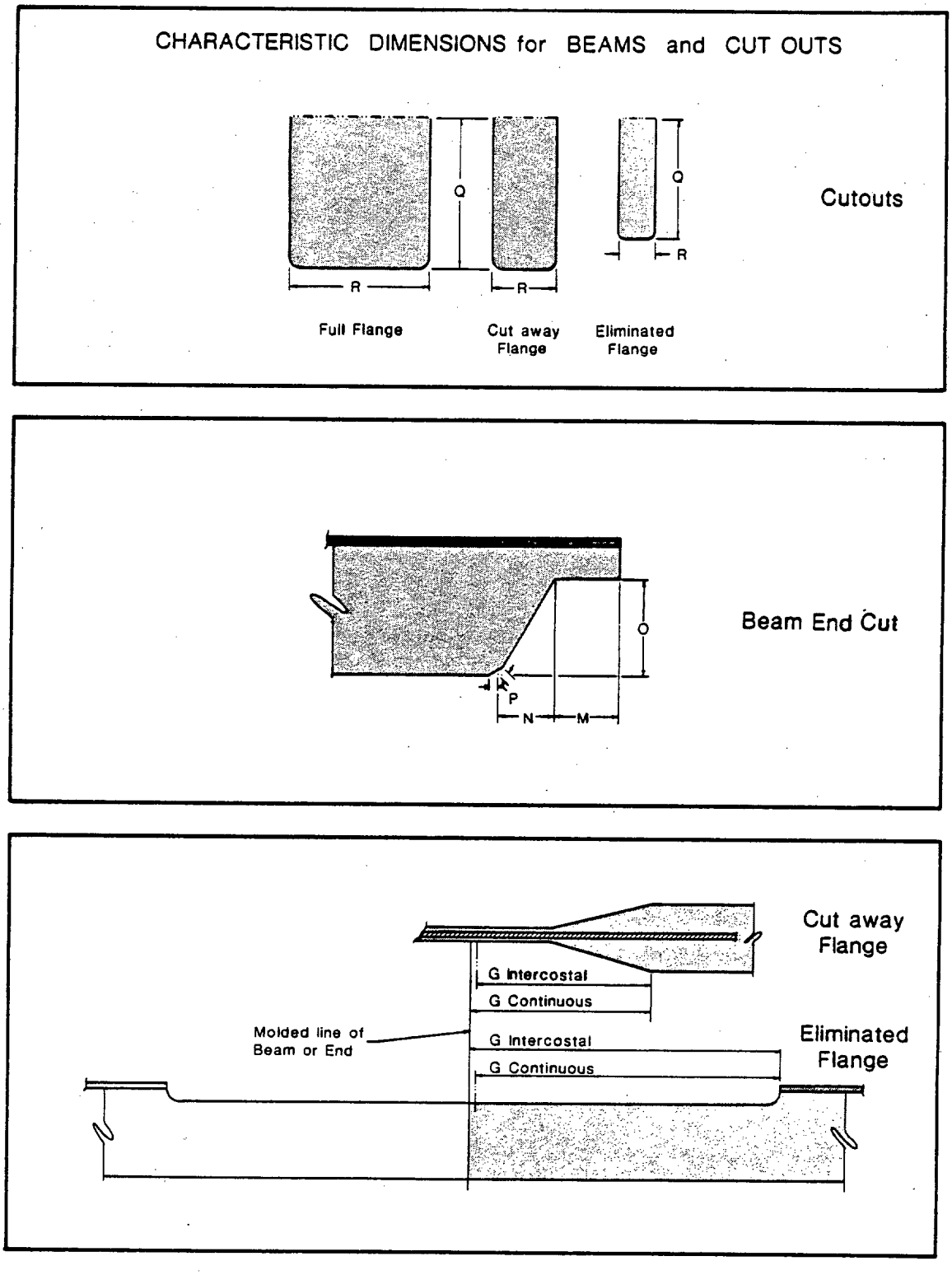

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FIGURE 3. Characteristic dimensions for beams and cutouts.

3.6.3 The detail for tube stanchions is the same for terminating and continuous applications. It is slightly more complicated than the I-beam stanchion details because of the transition from circular to T cross-section members. Brackets are used to transmit the tension or compression loads in the tube wall to the web of the backing members. If the stanchion intersection does not occur at the intersection of two T-section members, then the flange of the T-section must be supported by an in-line bracket. For heavy tube stanchions, reinforcement of the flange is provided by the use of a cap or sole plate.

3.6.4 For certain situations, flange inserts may be required to:

(a) Prevent a stanchion member or stanchion bracket from overhanging the flange.
(b) Provide additional bearing area for the cap or sole of a stanchion member.

Where used, the existing flange is cut away and replaced by the insert. Figures 15 through 21 and 44 through 53 present stanchion details.

4. GENERAL REQUIREMENTS

4.1 Materials.

4.1.1 Material for tangency brackets shall be ordinary strength steel for ordinary strength steel or high strength steel stiffeners.

4.1.2 Material for toe and in-line brackets shall be ordinary strength steel for ordinary strength steel or higher strength steel backing structure if intervening material is ordinary strength steel. Use high strength steel toe bracket if backing structure is higher strength steel and intervening material is high strength steel or stronger.

4.1.3 Full chocks shall be of a material similar to that of the member to be chocked.

4.1.4 Plate brackets, lapped collars and flush collars shall be of a material similar to that of the piercing member.

4.1.5 Lug collars shall be of a material similar to the main member or bulkhead plating.

4.1.6 ILS members shall be of a material similar to that of the supported members.

4.1.7 Hull pads shall be ordinary strength steel.

4.1.8 Inserts shall be of the same material as the parent member.

4.2 Welding.

4.2.1 Welds shall be continuous and all around.

4.2.2 Weld joint design and weld fit-up tolerance shall be in accordance with MIL-STD-22.

4.2.3 Fillet sizes shall be in accordance with MIL-STD-1628.

4.3 Preparation of rolled shapes. The dimensions indicated in table I are for rolled shapes produced by one of the methods in accordance with MIL-HDBK-264.

4.4 Units. Characteristic dimensions referenced herein are presented in inches, including plating thickness. Constant allowances for welding tolerance or clearance of rolled-shape radii are clearly indicated in the algorithms. For metric application of this handbook, these constant values must be converted to metric units. A table of metric equivalents is included in appendix B.

4.5 Geometric assumptions. Algorithms presented in this handbook are based on the following geometric assumptions:

(a) Intersections are right angles.
(b) Plate structures are planar for the extent of the detail.

4.6 Allowable dimensional variation and rounding practice. A practice which permits similarly sized unique pieces to be grouped together and identified with a common identification number has been assumed and is implicit in the detail element catalogs presented within this handbook. This practice is fully described in appendix C.

4.7 Presentation format. Each detail presented in this handbook is described in three formats:

(a) A key diagram with associated sections and details to identify all characteristic dimensions.
(b) Algorithms for the determination of characteristic dimensions.
(c) A table or tables identifying the appropriate detail dimensions for elemental details.

The use and interpretation of each of the tabular formats is discussed in detail in appendix D.

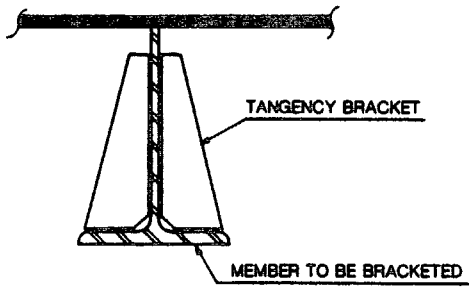
5. DETAILED REQUIREMENTS

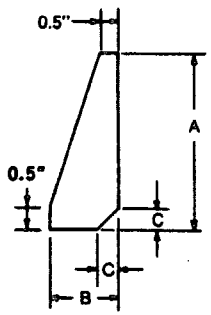
5.1 Elemental details. Elemental details are those details whose characteristic dimensions are a function of the cross-sectional properties of adjacent structural components. The elemental details considered in this handbook are presented on figures 4 through 21 and tables 5 through 26.

5.2 Intersection details. Intersection details are those details whose characteristic dimensions are a function of both the cross-sectional properties and the configuration of adjacent structural components. The intersection details considered in this handbook are presented on figures 22 through 53. The following types of intersection details are addressed in this section:

(a) Intersections of longitudinal and bulkhead stiffeners
(b) Intersections of longitudinal beam and transverse beam
(c) Corner brackets
(d) Stanchion details.

KEY DIAGRAM FOR TANGENCY BRACKET





DETAIL
FOR TANGENCY BRACKET

Algorithms for Tangency Bracket

A: $A = d - t_1 - 1.0"$

B: $B = .5(w_1 - t_w) - .25"$

C: $C = k - t_1 + .125"$

If $C > .5B$ _____ $C = .5B$

If $C < .5"$ and

$B > 1.0"$ _____ $C = .5"$

T: $T = t_w$

If $T < .1875"$ _____ $T = .1875"$

NOTE:

1. $d, t_1, t_w k$ and w_1 are dimensions of member to be bracketed

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FIGURE 4. Key diagram and algorithms for tangency bracket.

TABLE V. Tangency bracket - typical dimensions.

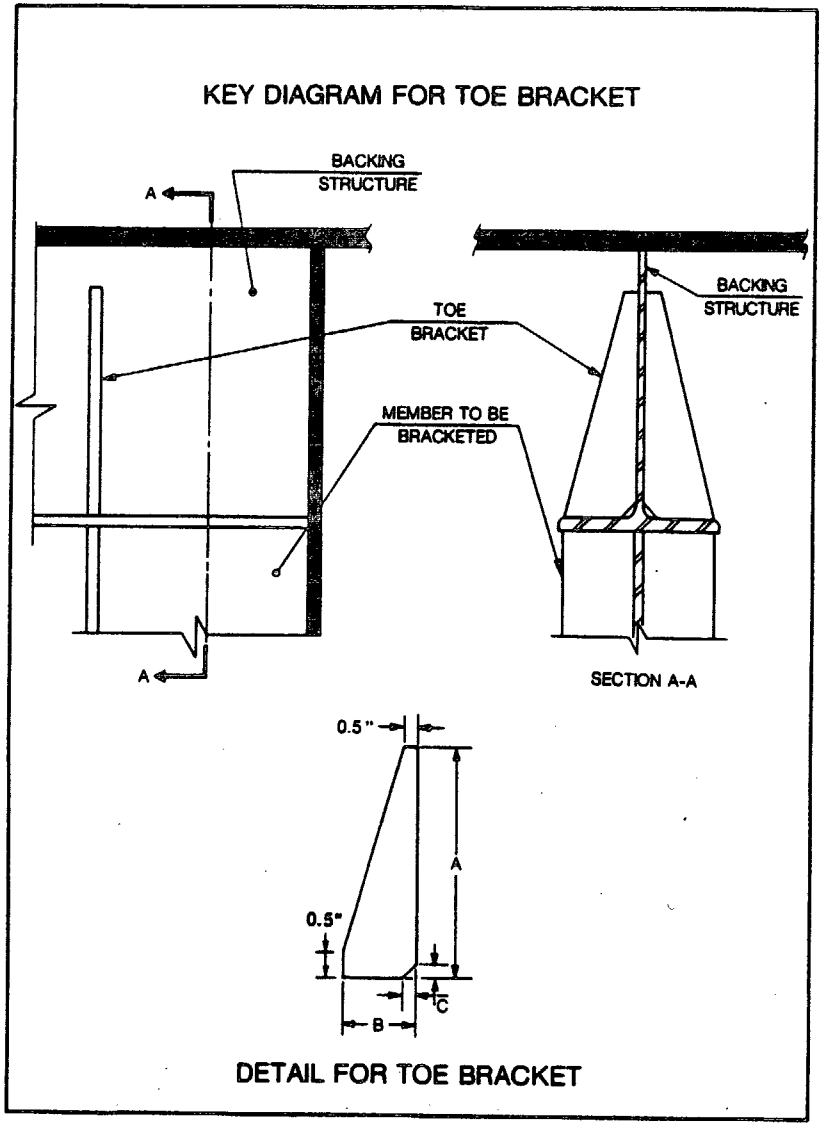
MEMBER TO BE BRACKETED						DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	TANGENCY BRACKET
IN	x	IN	x	LBS/FT		IN	IN	IN	IN	ID
1	x	4	x	5.0	T	3.0000	1.5000	0.7500	0.2500	1
2	x	4	x	6.5	T	3.0000	1.5000	0.7500	0.2500	1
3	x	4	x	7.5	T	3.0000	1.5000	0.7500	0.2500	1
4	x	5 1/4	x	9.0	T	3.0000	2.2500	0.7500	0.2500	11
5	x	4	x	13.0	I-T	3.0000	1.5000	0.5000	0.3750	19
6	x	4	x	6.0	T	4.0000	1.5000	0.7500	0.2500	2
7	x	4	x	7.5	T	4.0000	1.5000	0.7500	0.2500	2
8	x	4	x	8.5	T	4.0000	1.5000	0.7500	0.2500	2
9	x	4	x	9.5	T	4.0000	1.5000	0.7500	0.2500	2
10	x	5	x	16.0	I-T	4.0000	2.0000	0.7500	0.2500	8
11	x	5	x	19.0	I-T	4.0000	2.0000	0.7500	0.3750	23
12	x	4	x	7.0	T	5.0000	1.5000	0.7500	0.2500	4
13	x	4	x	7.0	T	5.0000	1.5000	0.7500	0.2500	4
14	x	4	x	9.0	I-T	5.0000	1.5000	0.5000	0.2500	3
15	x	4	x	9.5	T	5.0000	1.5000	0.7500	0.2500	4
16	x	4	x	11.0	T	5.0000	1.5000	0.7500	0.3750	21
17	x	4	x	12.0	I-T	5.0000	1.5000	0.5000	0.2500	3
18	x	6	x	15.0	I-T	5.0000	2.5000	0.5000	0.2500	15
19	x	4	x	16.0	I-T	5.0000	1.5000	0.5000	0.3750	20
20	x	6	x	20.0	I-T	5.0000	2.5000	0.7500	0.3750	28
21	x	5	x	11.0	T	6.0000	2.0000	0.7500	0.2500	9
22	x	5	x	13.0	T	6.0000	2.0000	0.7500	0.3750	24
23	x	6 3/4	x	15.0	T	6.0000	2.7500	0.7500	0.3750	32
24	x	6 3/4	x	17.0	T	6.0000	2.7500	0.7500	0.3750	32
25	x	6 3/4	x	19.0	T	6.0000	2.7500	0.7500	0.3750	32
26	x	8	x	21.5	T	6.0000	3.5000	1.0000	0.3750	39
27	x	8	x	24.0	T	6.0000	3.5000	1.0000	0.3750	39
28	x	4	x	10.0	I-T	7.0000	1.5000	0.7500	0.2500	5
29	x	4	x	13.0	I-T	7.0000	1.5000	0.7500	0.2500	5
30	x	5 1/2	x	13.0	T	7.0000	2.2500	1.0000	0.2500	13
31	x	4	x	15.0	I-T	7.0000	1.5000	0.7500	0.2500	5
32	x	5 1/2	x	15.5	T	7.0000	2.2500	1.0000	0.3750	26
33	x	5 1/4	x	18.0	I-T	7.0000	2.2500	0.7500	0.2500	12
34	x	7	x	18.0	T	7.0000	3.0000	1.0000	0.3750	36
35	x	7	x	20.0	T	7.0000	3.0000	1.0000	0.3750	36

TABLE V. Tangency bracket - typical dimensions. - Continued

MEMBER TO BE BRACKETED			DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	TANGENCY BRACKET
IN x IN x LBS/FT			IN	IN	IN	IN	ID
36	8	x 5 1/4 x 21.0 I-T	7.0000	2.2500	0.7500	0.2500	12
37	8	x 7 x 22.5 T	7.0000	3.0000	1.0000	0.3750	36
38	8	x 6 1/4 x 24.0 I-T	7.0000	2.7500	0.7500	0.2500	17
39	8	x 7 1/8 x 25.0 T	7.0000	3.0000	1.0000	0.5000	47
40	8	x 6 1/2 x 28.0 I-T	7.0000	2.7500	0.7500	0.3750	33
41	8	x 7 1/8 x 28.5 T	7.0000	3.0000	0.5000	0.5000	46
42	8	x 8 x 31.0 I-T	7.0000	3.5000	0.7500	0.3750	40
43	9	x 6 x 17.5 T	8.0000	2.5000	1.0000	0.3750	29
44	9	x 6 x 20.0 T	8.0000	2.5000	1.0000	0.3750	29
45	10	x 4 x 12.0 I-T	9.0000	1.5000	0.7500	0.2500	6
46	10	x 4 x 15.0 I-T	9.0000	1.5000	0.7500	0.2500	6
47	10	x 4 x 17.0 I-T	9.0000	1.5000	0.7500	0.2500	6
48	10	x 4 x 19.0 I-T	9.0000	1.5000	0.7500	0.2500	6
49	10	x 5 3/4 x 22.0 I-T	9.0000	2.5000	0.7500	0.2500	16
50	10	x 5 3/4 x 26.0 I-T	9.0000	2.5000	0.7500	0.3750	30
51	10	x 5 3/4 x 30.0 I-T	9.0000	2.5000	0.7500	0.3750	30
52	10	x 8 x 33.0 I-T	9.0000	3.5000	1.0000	0.3750	42
53	10	x 8 x 39.0 I-T	9.0000	3.5000	0.7500	0.3750	41
54	10	x 8 x 45.0 I-T	9.0000	3.5000	1.0000	0.3750	42
55	12	x 4 x 14.0 I-T	11.0000	1.5000	0.7500	0.2500	7
56	12	x 4 x 16.0 I-T	11.0000	1.5000	0.7500	0.2500	7
57	12	x 4 x 19.0 I-T	11.0000	1.5000	0.7500	0.2500	7
58	12	x 4 x 22.0 I-T	11.0000	1.5000	0.7500	0.3750	22
59	12	x 6 1/2 x 26.0 I-T	11.0000	2.7500	0.7500	0.2500	18
60	12	x 6 1/2 x 30.0 I-T	11.0000	2.7500	0.7500	0.3750	34
61	12	x 6 1/2 x 35.0 I-T	11.0000	2.7500	0.7500	0.3750	34
62	12	x 8 x 40.0 I-T	11.0000	3.5000	1.0000	0.3750	43
63	12	x 8 x 45.0 I-T	11.0000	3.5000	1.0000	0.3750	43
64	12	x 8 1/8 x 50.0 I-T	11.0000	3.5000	1.0000	0.3750	43
65	12	x 10 x 53.0 I-T	11.0000	4.5000	1.0000	0.3750	45
66	12	x 10 x 58.0 I-T	11.0000	4.5000	1.0000	0.3750	45
67	14	x 5 x 22.0 I-T	13.0000	2.0000	0.7500	0.2500	10
68	14	x 5 x 26.0 I-T	13.0000	2.0000	0.7500	0.3750	25
69	14	x 6 3/4 x 30.0 I-T	13.0000	2.7500	0.7500	0.3750	35
70	14	x 6 3/4 x 34.0 I-T	13.0000	2.7500	0.7500	0.3750	35

TABLE V. Tangency bracket - typical dimensions. - Continued

MEMBER TO BE BRACKETED			DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	TANGENCY BRACKET
IN x IN x LBS/FT			IN	IN	IN	IN	ID
71	14	x 6 3/4 x 38.0 I-T	13.0000	2.7500	0.7500	0.3750	35
72	14	x 8 x 43.0 I-T	13.0000	3.5000	1.0000	0.3750	44
73	14	x 8 x 48.0 I-T	13.0000	3.5000	1.0000	0.3750	44
74	16	x 5 1/2 x 26.0 I-T	15.0000	2.2500	1.0000	0.2500	14
75	16	x 5 1/2 x 31.0 I-T	15.0000	2.2500	1.0000	0.3750	27
76	16	x 7 x 36.0 I-T	15.0000	3.0000	1.0000	0.3750	37
77	16	x 7 x 40.0 I-T	15.0000	3.0000	1.0000	0.3750	37
78	16	x 7 x 45.0 I-T	15.0000	3.0000	1.0000	0.3750	37
79	16	x 7 1/8 x 50.0 I-T	15.0000	3.0000	1.0000	0.5000	48
80	16	x 7 1/8 x 57.0 I-T	15.0000	3.0000	1.0000	0.5000	48
81	16	x 10 1/4 x 67.0 I-T	15.0000	4.5000	1.0000	0.5000	51
82	16	x 10 1/4 x 77.0 I-T	15.0000	4.5000	1.0000	0.5000	51
83	16	x 10 3/8 x 89.0 I-T	15.0000	4.5000	1.0000	0.6250	55
84	18	x 6 x 35.0 I-T	17.0000	2.5000	1.0000	0.3750	31
85	18	x 6 x 40.0 I-T	17.0000	2.5000	1.0000	0.3750	31
86	18	x 7 1/2 x 50.0 I-T	17.0000	3.2500	1.0000	0.3750	38
87	18	x 7 1/2 x 60.0 I-T	17.0000	3.2500	1.0000	0.5000	49
88	18	x 7 5/8 x 71.0 I-T	17.0000	3.2500	1.0000	0.5000	49
89	18	x 11 1/8 x 86.0 I-T	17.0000	5.0000	1.0000	0.5000	52
90	18	x 11 1/8 x 97.0 I-T	17.0000	5.0000	1.0000	0.6250	56
91	18	x 11 1/4 x 106.0 I-T	17.0000	5.0000	1.0000	0.6250	56
92	18	x 11 1/4 x 119.0 I-T	17.0000	5.0000	1.0000	0.7500	58
93	21	x 8 1/4 x 62.0 I-T	20.0000	3.5000	1.0000	0.5000	50
94	21	x 8 1/4 x 68.0 I-T	20.0000	3.5000	1.0000	0.5000	50
95	21	x 8 1/4 x 73.0 I-T	20.0000	3.5000	1.0000	0.5000	50
96	21	x 8 3/8 x 83.0 I-T	20.0000	3.5000	1.0000	0.6250	54
97	21	x 8 3/8 x 93.0 I-T	20.0000	3.5000	1.0000	0.6250	54
98	21	x 12 1/4 x 101.0 I-T	20.0000	5.5000	1.0000	0.5000	53
99	21	x 12 3/8 x 111.0 I-T	20.0000	5.5000	1.0000	0.6250	57



Algorithms for Toe Bracket

T: $T = t_f$

If $T < .1875"$ _____ $T = .1875"$

A: $A = 1.5w_f$

If $t_b < .5t_f$ _____ $A = .75w_f \frac{t_f}{t_b}$

B: $B = .5(w_f - t_w)$

C: $C = t_b + .125"$

If $C > .5B$ _____ $C = .5B$

If $C < .5"$ and

$B > 1.0"$ _____ $C = .5"$

NOTE:

1. t_b is thickness of backing structure t_f, w_f, & t_w are dimensions of member to be bracketed
2. All dimensions must be checked against space available. For a structural shape backing structure with dimensions d_b, w_{fb}, t_{fb}, t_{wb} and k_b:

   $A < d_b - t_{fb} - 1"$

   $B < .5(w_{fb} - t_{wb}) - .25"$

   $C > k_b - t_{fb} + .125$
3. Radius of $\frac{C}{2}$ is acceptable

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FIGURE 5. Key diagram and algorithms for toe brackets.

TABLE VI. Standard toe bracket index.

	MEMBER TO BE BRACKETED IN x IN x LBS/FT							THICKNESS OF BACKING STRUCTURE (16ths in.)											
								3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	4	x	4		x	5.0	T	1	1	2	2	9	9	34	34	69	69	105	105	152	152
2	4	x	4		x	6.5	T	2	2	2	2	9	9	34	34	69	69	105	105	152	152
3	4	x	4		x	7.5	T	3	3	3	3	10	10	35	35	70	70	106	106	153	153
4	4	x	5	1/4	x	9.0	T	5	5	5	5	15	15	37	37	72	72	108	108	155	155
5	4	x	4		x	13.0	I-T	3	3	3	3	10	10	35	35	70	70	106	106	153	153
6	5	x	4		x	6.0	T	1	1	2	2	9	9	34	34	69	69	105	105	152	152
7	5	x	4		x	7.5	T	2	2	2	2	9	9	34	34	69	69	105	105	152	152
8	5	x	4		x	8.5	T	3	3	3	3	10	10	35	35	70	70	106	106	153	153
9	5	x	4		x	9.5	T	10	10	10	10	10	10	35	35	70	70	106	106	153	153
10	5	x	5		x	16.0	I-T	4	4	4	4	12	12	36	36	71	71	107	107	154	154
11	5	x	5		x	19.0	I-T	13	11	11	11	12	12	36	36	71	71	107	107	154	154
12	6	x	4		x	7.0	T	1	1	2	2	9	9	34	34	69	69	105	105	152	152
13	6	x	4		x	7.0	T	2	2	2	2	9	9	34	34	69	69	105	105	152	152
14	6	x	4		x	9.0	I-T	1	1	2	2	9	9	34	34	69	69	105	105	152	152
15	6	x	4		x	9.5	T	3	3	3	3	10	10	35	35	70	70	106	106	153	153
16	6	x	4		x	11.0	T	10	10	10	10	10	10	35	35	70	70	106	106	153	153
17	6	x	4		x	12.0	I-T	2	2	2	2	9	9	34	34	69	69	105	105	152	152
18	6	x	6		x	15.0	I-T	7	7	7	7	20	20	40	40	74	74	110	110	157	157
19	6	x	4		x	16.0	I-T	10	10	10	10	10	10	35	35	70	70	106	106	153	153
20	6	x	6		x	20.0	I-T	8	8	8	8	21	21	42	42	75	75	111	111	158	158
21	7	x	5		x	11.0	T	4	4	4	4	12	12	36	36	71	71	107	107	154	154
22	7	x	5		x	13.0	T	13	11	11	11	12	12	36	36	71	71	107	107	154	154
23	7	x	6	3/4	x	15.0	T	25	25	25	25	26	26	48	48	77	77	113	113	160	160
24	7	x	6	3/4	x	17.0	T	27	25	25	25	26	26	48	48	77	77	113	113	160	160
25	7	x	6	3/4	x	19.0	T	49	47	47	47	48	48	48	48	77	77	113	113	160	160
26	7	x	8		x	21.5	T	62	59	57	57	58	58	58	58	89	89	120	120	163	163
27	7	x	8		x	24.0	T	63	61	59	59	60	60	60	60	91	91	122	122	165	165
28	8	x	4		x	10.0	I-T	1	1	2	2	9	9	34	34	69	69	105	105	152	152
29	8	x	4		x	13.0	I-T	2	2	2	2	9	9	34	34	69	69	105	105	152	152
30	8	x	5	1/2	x	13.0	T	6	6	6	6	17	17	38	38	73	73	109	109	156	156
31	8	x	4		x	15.0	I-T	3	3	3	3	10	10	35	35	70	70	106	106	153	153
32	8	x	5	1/2	x	15.5	T	18	16	16	16	17	17	38	38	73	73	109	109	156	156
33	8	x	5	1/4	x	18.0	I-T	5	5	5	5	15	15	37	37	72	72	108	108	155	155
34	8	x	7		x	18.0	T	30	28	28	28	29	29	51	51	79	79	114	114	161	161
35	8	x	7		x	20.0	T	52	50	50	50	51	51	51	51	79	79	114	114	161	161
36	8	x	5	1/4	x	21.0	I-T	16	14	14	14	15	15	37	37	72	72	108	108	155	155
37	8	x	7		x	22.5	T	52	50	50	50	51	51	51	51	79	79	114	114	161	161

TABLE VI. Standard toe bracket index. - Continued

	MEMBER TO BE BRACKETED IN x IN x LBS/FT						THICKNESS OF BACKING STRUCTURE (16ths in.)													
							3	4	5	6	7	8	9	10	11	12	13	14	15	16
38	8	x	6 1/4	x	24.0	I-T	25	23	23	23	24	24	46	46	76	76	112	112	159	159
39	8	x	7 1/8	x	25.0	T	82	80	78	78	79	79	79	79	79	79	114	114	161	161
40	8	x	6 1/2	x	28.0	I-T	27	23	23	23	24	24	46	46	76	76	112	112	159	159
41	8	x	7 1/8	x	28.5	T	83	81	80	78	79	79	79	79	79	79	114	114	161	161
42	8	x	8	x	31.0	I-T	33	31	31	31	32	32	58	58	89	89	120	120	163	163
43	9	x	6	x	17.5	T	22	19	19	19	20	20	40	40	74	74	110	110	157	157
44	9	x	6	x	20.0	T	44	41	41	41	42	42	42	42	75	75	111	111	158	158
45	10	x	4	x	12.0	I-T	1	1	2	2	9	9	34	34	69	69	105	105	152	152
46	10	x	4	x	15.0	I-T	2	2	2	2	9	9	34	34	69	69	105	105	152	152
47	10	x	4	x	17.0	I-T	3	3	3	3	10	10	35	35	70	70	106	106	153	153
48	10	x	4	x	19.0	I-T	10	10	10	10	10	10	35	35	70	70	106	106	153	153
49	10	x	5 3/4	x	22.0	I-T	7	7	7	7	20	20	40	40	74	74	110	110	157	157
50	10	x	5 3/4	x	26.0	I-T	22	19	19	19	20	20	40	40	74	74	110	110	157	157
51	10	x	5 3/4	x	30.0	I-T	43	39	39	39	40	40	40	40	74	74	110	110	157	157
52	10	x	8	x	33.0	I-T	33	31	31	31	32	32	58	58	89	89	120	120	163	163
53	10	x	8	x	39.0	I-T	62	59	57	57	58	58	58	58	89	89	120	120	163	163
54	10	x	8	x	45.0	I-T	63	61	59	59	60	60	60	60	91	91	122	122	165	165
55	12	x	4	x	14.0	I-T	1	1	2	2	9	9	34	34	69	69	105	105	152	152
56	12	x	4	x	16.0	I-T	2	2	2	2	9	9	34	34	69	69	105	105	152	152
57	12	x	4	x	19.0	I-T	3	3	3	3	10	10	35	35	70	70	106	106	153	153
58	12	x	4	x	22.0	I-T	10	10	10	10	10	10	35	35	70	70	106	106	153	153
59	12	x	6 1/2	x	26.0	I-T	23	23	23	23	24	24	46	46	76	76	112	112	159	159
60	12	x	6 1/2	x	30.0	I-T	25	23	23	23	24	24	46	46	76	76	112	112	159	159
61	12	x	6 1/2	x	35.0	I-T	49	47	45	45	46	46	46	46	76	76	112	112	159	159
62	12	x	8	x	40.0	I-T	62	59	59	59	60	60	60	60	91	91	122	122	165	165
63	12	x	8	x	45.0	I-T	63	59	59	59	60	60	60	60	91	91	122	122	165	165
64	12	x	8 1/8	x	50.0	I-T	95	92	90	90	91	91	91	91	91	91	122	122	165	165
65	12	x	10	x	53.0	I-T	68	67	65	65	66	66	66	66	99	99	127	127	170	170
66	12	x	10	x	58.0	I-T	103	101	98	98	99	99	99	99	99	99	127	127	170	170
67	14	x	5	x	22.0	I-T	4	4	4	4	12	12	36	36	71	71	107	107	154	154
68	14	x	5	x	26.0	I-T	13	11	11	11	12	12	36	36	71	71	107	107	154	154
69	14	x	6 3/4	x	30.0	I-T	25	25	25	25	26	26	48	48	77	77	113	113	160	160
70	14	x	6 3/4	x	34.0	I-T	27	25	25	25	26	26	48	48	77	77	113	113	160	160
71	14	x	6 3/4	x	38.0	I-T	49	47	47	47	48	48	48	48	77	77	113	113	160	160
72	14	x	8	x	43.0	I-T	62	59	57	57	58	58	58	58	89	89	120	120	163	163
73	14	x	8	x	48.0	I-T	63	61	59	59	60	60	60	60	91	91	122	122	165	165
74	16	x	5 1/2	x	26.0	I-T	6	6	6	6	17	17	38	38	73	73	109	109	156	156

TABLE VI. Standard toe bracket index. - Continued

MEMBER TO BE BRACKETED IN x IN x LBS/FT									THICKNESS OF BACKING STRUCTURE (16ths in.)									
									3	4	5	6	7	8	9	10	11	12	13	14	15	16
75	16	x	5	1/2	x	31.0	I-T		18	16	16	16	17	17	38	38	73	73	109	109	156	156
76	16	x	7		x	36.0	I-T		30	28	28	28	29	29	51	51	79	79	114	114	161	161
77	16	x	7		x	40.0	I-T		52	50	50	50	51	51	51	51	79	79	114	114	161	161
78	16	x	7		x	45.0	I-T		52	50	50	50	51	51	51	51	79	79	114	114	161	161
79	16	x	7	1/8	x	50.0	I-T		82	80	78	78	79	79	79	79	79	79	114	114	161	161
80	16	x	7	1/8	x	57.0	I-T		83	81	80	78	79	79	79	79	79	79	114	114	161	161
81	16	x	10	1/4	x	67.0	I-T		104	102	100	98	99	99	99	99	99	99	127	127	170	170
82	16	x	10	1/4	x	77.0	I-T		132	130	128	126	127	127	127	127	127	127	127	127	170	170
83	16	x	10	3/8	x	89.0	I-T		133	131	129	128	127	127	127	127	127	127	127	127	170	170
84	18	x	6		x	35.0	I-T		22	19	19	19	20	20	40	40	74	74	110	110	157	157
85	18	x	6		x	40.0	I-T		44	41	41	41	42	42	42	42	75	75	111	111	158	158
86	18	x	7	1/2	x	50.0	I-T		56	55	53	53	54	54	54	54	85	85	115	115	162	162
87	18	x	7	1/2	x	60.0	I-T		88	87	86	84	85	85	85	85	85	85	115	115	162	162
88	18	x	7	5/8	x	71.0	I-T		119	118	117	116	115	115	115	115	115	115	115	115	162	162
89	18	x	11	1/8	x	86.0	I-T		141	139	137	134	135	135	135	135	135	135	135	135	172	172
90	18	x	11	1/8	x	97.0	I-T		142	140	138	136	135	135	135	135	135	135	135	135	172	172
91	18	x	11	1/4	x	106.0	I-T		177	176	175	174	173	171	171	171	171	171	171	171	172	172
92	18	x	11	1/4	x	119.0	I-T		185	184	183	182	181	179	179	179	179	179	179	179	180	180
93	21	x	8	1/4	x	62.0	I-T		64	61	59	59	60	60	60	60	91	91	122	122	165	165
94	21	x	8	1/4	x	68.0	I-T		96	93	90	90	91	91	91	91	91	91	122	122	165	165
95	21	x	8	1/4	x	73.0	I-T		97	94	92	90	91	91	91	91	91	91	122	122	165	165
96	21	x	8	3/8	x	83.0	I-T		125	124	123	121	122	122	122	122	122	122	122	122	165	165
97	21	x	8	3/8	x	93.0	I-T		169	168	167	166	164	164	164	164	164	164	164	164	165	165
98	21	x	12	1/4	x	101.0	I-T		150	148	146	143	144	144	144	144	144	144	144	144	178	178
99	21	x	12	3/8	x	111.0	I-T		151	149	147	145	144	144	144	144	144	144	144	144	178	178

TABLE VII. Summary of standard toe brackets.

TOE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
1	6.0000	1.7500	0.5000	0.2500	14
2	6.0000	1.7500	0.5000	0.3750	42
3	7.0000	1.7500	0.5000	0.3750	28
4	8.0000	2.2500	0.5000	0.3750	12
5	8.0000	2.5000	0.5000	0.3750	8
6	9.0000	2.5000	0.5000	0.3750	8
7	9.0000	2.7500	0.5000	0.3750	8
8	10.0000	2.7500	0.5000	0.3750	4
9	6.0000	1.7500	0.5000	0.5000	28
10	7.0000	1.7500	0.5000	0.5000	44
11	8.0000	2.2500	0.5000	0.5000	9
12	8.0000	2.2500	1.0000	0.5000	12
13	9.0000	2.2500	0.5000	0.5000	3
14	8.0000	2.5000	0.5000	0.5000	3
15	8.0000	2.5000	1.0000	0.5000	6
16	9.0000	2.5000	0.5000	0.5000	7
17	9.0000	2.5000	1.0000	0.5000	8
18	10.0000	2.5000	0.5000	0.5000	2
19	9.0000	2.7500	0.5000	0.5000	9
20	9.0000	2.7500	1.0000	0.5000	10
21	10.0000	2.7500	1.0000	0.5000	2
22	12.0000	2.7500	0.5000	0.5000	3
23	10.0000	3.0000	0.5000	0.5000	13
24	10.0000	3.0000	1.0000	0.5000	8
25	12.0000	3.0000	0.5000	0.5000	16
26	12.0000	3.0000	1.0000	0.5000	8
27	14.0000	3.0000	0.5000	0.5000	3
28	12.0000	3.2500	0.5000	0.5000	6
29	12.0000	3.2500	1.0000	0.5000	4
30	14.0000	3.2500	0.5000	0.5000	2
31	12.0000	3.7500	0.5000	0.5000	6
32	12.0000	3.7500	1.0000	0.5000	4
33	14.0000	3.7500	0.5000	0.5000	2
34	6.0000	1.7500	0.5000	0.6250	28
35	7.0000	1.7500	0.5000	0.6250	24

TABLE VII. Summary of standard toe brackets. - Continued

TOE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
36	8.0000	2.2500	1.0000	0.6250	12
37	8.0000	2.5000	1.0000	0.6250	6
38	9.0000	2.5000	1.0000	0.6250	8
39	9.0000	2.7500	0.5000	0.6250	3
40	9.0000	2.7500	1.0000	0.6250	14
41	10.0000	2.7500	0.5000	0.6250	6
42	10.0000	2.7500	1.0000	0.6250	10
43	12.0000	2.7500	0.5000	0.6250	1
44	14.0000	2.7500	0.5000	0.6250	2
45	10.0000	3.0000	0.5000	0.6250	2
46	10.0000	3.0000	1.0000	0.6250	12
47	12.0000	3.0000	0.5000	0.6250	7
48	12.0000	3.0000	1.0000	0.6250	16
49	14.0000	3.0000	0.5000	0.6250	3
50	12.0000	3.2500	0.5000	0.6250	12
51	12.0000	3.2500	1.0000	0.6250	20
52	16.0000	3.2500	0.5000	0.6250	4
53	12.0000	3.5000	0.5000	0.6250	2
54	12.0000	3.5000	1.0000	0.6250	4
55	14.0000	3.5000	0.5000	0.6250	1
56	18.0000	3.5000	0.5000	0.6250	1
57	12.0000	3.7500	0.5000	0.6250	6
58	12.0000	3.7500	1.0000	0.6250	16
59	14.0000	3.7500	0.5000	0.6250	17
60	14.0000	3.7500	1.0000	0.6250	24
61	16.0000	3.7500	0.5000	0.6250	4
62	18.0000	3.7500	0.5000	0.6250	4
63	20.0000	3.7500	0.5000	0.6250	4
64	22.0000	3.7500	0.5000	0.6250	1
65	16.0000	4.7500	0.5000	0.6250	2
66	16.0000	4.7500	1.0000	0.6250	4
67	18.0000	4.7500	0.5000	0.6250	1
68	24.0000	4.7500	0.5000	0.6250	1
69	6.0000	1.7500	0.5000	0.7500	28
70	7.0000	1.7500	0.5000	0.7500	24
71	8.0000	2.2500	1.0000	0.7500	12

TABLE VII. Summary of standard toe brackets. - Continued

TOE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
72	8.0000	2.5000	1.0000	0.7500	6
73	9.0000	2.5000	1.0000	0.7500	8
74	9.0000	2.7500	1.0000	0.7500	12
75	10.0000	2.7500	1.0000	0.7500	6
76	10.0000	3.0000	1.0000	0.7500	10
77	12.0000	3.0000	1.0000	0.7500	12
78	12.0000	3.2500	0.5000	0.7500	6
79	12.0000	3.2500	1.0000	0.7500	36
80	14.0000	3.2500	0.5000	0.7500	4
81	16.0000	3.2500	0.5000	0.7500	2
82	18.0000	3.2500	0.5000	0.7500	2
83	22.0000	3.2500	0.5000	0.7500	2
84	12.0000	3.5000	0.5000	0.7500	1
85	12.0000	3.5000	1.0000	0.7500	8
86	14.0000	3.5000	0.5000	0.7500	1
87	16.0000	3.5000	0.5000	0.7500	1
88	22.0000	3.5000	0.5000	0.7500	1
89	12.0000	3.7500	1.0000	0.7500	10
90	14.0000	3.7500	0.5000	0.7500	5
91	14.0000	3.7500	1.0000	0.7500	30
92	16.0000	3.7500	0.5000	0.7500	2
93	18.0000	3.7500	0.5000	0.7500	1
94	20.0000	3.7500	0.5000	0.7500	1
95	22.0000	3.7500	0.5000	0.7500	1
96	24.0000	3.7500	0.5000	0.7500	1
97	27.0000	3.7500	0.5000	0.7500	1
98	16.0000	4.7500	0.5000	0.7500	3
99	16.0000	4.7500	1.0000	0.7500	14
100	18.0000	4.7500	0.5000	0.7500	1
101	20.0000	4.7500	0.5000	0.7500	1
102	22.0000	4.7500	0.5000	0.7500	1
103	27.0000	4.7500	0.5000	0.7500	1
104	30.0000	4.7500	0.5000	0.7500	1
105	6.0000	1.7500	0.5000	0.8750	28
106	7.0000	1.7500	0.5000	0.8750	24
107	8.0000	2.2500	1.0000	0.8750	12

TABLE VII. Summary of standard toe brackets. - Continued

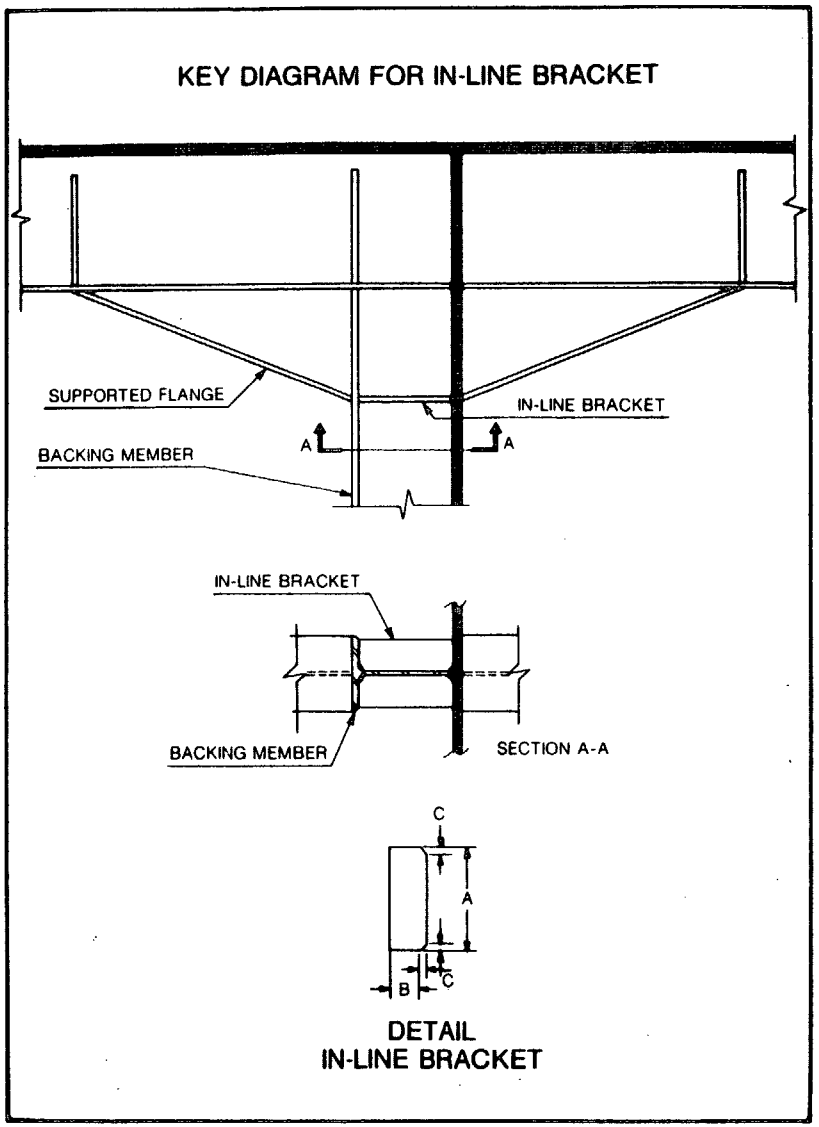
TOE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
108	8.0000	2.5000	1.0000	0.8750	6
109	9.0000	2.5000	1.0000	0.8750	8
110	9.0000	2.7500	1.0000	0.8750	12
111	10.0000	2.7500	1.0000	0.8750	6
112	10.0000	3.0000	1.0000	0.8750	10
113	12.0000	3.0000	1.0000	0.8750	12
114	12.0000	3.2500	1.0000	0.8750	20
115	12.0000	3.5000	1.0000	0.8750	12
116	14.0000	3.5000	0.5000	0.8750	1
117	16.0000	3.5000	0.5000	0.8750	1
118	20.0000	3.5000	0.5000	0.8750	1
119	27.0000	3.5000	0.5000	0.8750	1
120	12.0000	3.7500	1.0000	0.8750	10
121	14.0000	3.7500	0.5000	0.8750	1
122	14.0000	3.7500	1.0000	0.8750	26
123	18.0000	3.7500	0.5000	0.8750	1
124	22.0000	3.7500	0.5000	0.8750	1
125	30.0000	3.7500	0.5000	0.8750	1
126	16.0000	4.7500	0.5000	0.8750	1
127	16.0000	4.7500	1.0000	0.8750	22
128	20.0000	4.7500	0.5000	0.8750	2
129	22.0000	4.7500	0.5000	0.8750	1
130	24.0000	4.7500	0.5000	0.8750	1
131	30.0000	4.7500	0.5000	0.8750	1
132	33.0000	4.7500	0.5000	0.8750	1
133	40.0000	4.7500	0.5000	0.8750	1
134	18.0000	5.2500	0.5000	0.8750	1
135	18.0000	5.2500	1.0000	0.8750	16
136	20.0000	5.2500	0.5000	0.8750	1
137	22.0000	5.2500	0.5000	0.8750	1
138	24.0000	5.2500	0.5000	0.8750	1
139	27.0000	5.2500	0.5000	0.8750	1
140	30.0000	5.2500	0.5000	0.8750	1
141	36.0000	5.2500	0.5000	0.8750	1
142	40.0000	5.2500	0.5000	0.8750	1
143	20.0000	5.7500	0.5000	0.8750	1

TABLE VII. Summary of standard toe brackets. - Contined

TOE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
144	20.0000	5.7500	1.0000	0.8750	16
145	22.0000	5.7500	0.5000	0.8750	1
146	24.0000	5.7500	0.5000	0.8750	1
147	27.0000	5.7500	0.5000	0.8750	1
148	30.0000	5.7500	0.5000	0.8750	1
149	33.0000	5.7500	0.5000	0.8750	1
150	40.0000	5.7500	0.5000	0.8750	1
151	44.0000	5.7500	0.5000	0.8750	1
152	6.0000	1.7500	0.5000	1.0000	28
153	7.0000	1.7500	0.5000	1.0000	24
154	8.0000	2.2500	1.0000	1.0000	12
155	8.0000	2.5000	1.0000	1.0000	6
156	9.0000	2.5000	1.0000	1.0000	8
157	9.0000	2.7500	1.0000	1.0000	12
158	10.0000	2.7500	1.0000	1.0000	6
159	10.0000	3.0000	1.5000	1.0000	10
160	12.0000	3.0000	1.5000	1.0000	12
161	12.0000	3.2500	1.5000	1.0000	20
162	12.0000	3.5000	1.5000	1.0000	6
163	12.0000	3.7500	1.5000	1.0000	10
164	14.0000	3.7500	1.0000	1.0000	8
165	14.0000	3.7500	1.5000	1.0000	22
166	16.0000	3.7500	0.5000	1.0000	1
167	20.0000	3.7500	0.5000	1.0000	1
168	24.0000	3.7500	0.5000	1.0000	1
169	33.0000	3.7500	0.5000	1.0000	1
170	16.0000	4.7500	1.5000	1.0000	10
171	18.0000	5.2500	1.0000	1.0000	7
172	18.0000	5.2500	1.5000	1.0000	6
173	20.0000	5.2500	1.0000	1.0000	1
174	22.0000	5.2500	0.5000	1.0000	1
175	27.0000	5.2500	0.5000	1.0000	1
176	33.0000	5.2500	0.5000	1.0000	1
177	44.0000	5.2500	0.5000	1.0000	1
178	20.0000	5.7500	1.5000	1.0000	4
179	18.0000	5.2500	1.0000	1.1250	7

TABLE VII. Summary of standard toe brackets. - Continued

TOE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
180	18.0000	5.2500	1.5000	1.1250	2
181	22.0000	5.2500	1.0000	1.1250	1
182	24.0000	5.2500	0.5000	1.1250	1
183	30.0000	5.2500	0.5000	1.1250	1
184	36.0000	5.2500	0.5000	1.1250	1
185	48.0000	5.2500	0.5000	1.1250	1



Algorithms for In – Line Bracket

✱ A: $A = d - t_f$

B: $B = .5(w_f - t_w) - .25"$

C:
If $t_w \geq k - t_f$ _____ $C = t_w + .125"$
If $t_w < k - t_f$ _____ $C = k - t_f + .125"$
If $C > .5B$ _____ $C = .5B$
If $C < .5"$ and
$B > 1.0"$ _____ $C = .5"$

T:
If $t_s > t_w$ _____ $T = t_s$
If $t_s \leq t_w$ _____ $T = t_w$

NOTE:
t_s is thickness of supported flange
d, t_f, t_w, k & w_f are dimensions of backing member

✱ indicates a neat fit dimension

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FIGURE 6. Key diagram and algorithms for in-line bracket.

TABLE VIII. Standard in-line bracket index.

NOMINAL SIZE OF BACKING MEMBER IN x IN x LBS/FT							THICKNESS OF SUPPORTED FLANGE (16ths in.)												
							3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	4	x	4	x	5.0	T	1	1	23	23	65	65	115	115	166	166	217	217	268	268
2	4	x	4	x	6.5	T	1	1	23	23	65	65	115	115	166	166	217	217	268	268
3	4	x	4	x	7.5	T	1	1	23	23	65	65	115	115	166	166	217	217	268	268
4	4	x	5 1/4	x	9.0	T	15	15	38	38	80	80	130	130	181	181	232	232	283	283
5	4	x	4	x	13.0	I-T	24	24	24	24	66	66	116	116	167	167	218	218	269	269
6	5	x	4	x	6.0	T	2	2	25	25	67	67	117	117	168	168	219	219	270	270
7	5	x	4	x	7.5	T	2	2	25	25	67	67	117	117	168	168	219	219	270	270
8	5	x	4	x	8.5	T	2	2	25	25	67	67	117	117	168	168	219	219	270	270
9	5	x	4	x	9.5	T	2	2	25	25	67	67	117	117	168	168	219	219	270	270
10	5	x	5	x	16.0	I-T	12	12	35	35	77	77	127	127	178	178	229	229	280	280
11	5	x	5	x	19.0	I-T	35	35	35	35	77	77	127	127	178	178	229	229	280	280
12	6	x	4	x	7.0	T	4	4	27	27	69	69	119	119	170	170	221	221	272	272
13	6	x	4	x	7.0	T	4	4	27	27	69	69	119	119	170	170	221	221	272	272
14	6	x	4	x	9.0	I-T	3	3	26	26	68	68	118	118	169	169	220	220	271	271
15	6	x	4	x	9.5	T	4	4	27	27	69	69	119	119	170	170	221	221	272	272
16	6	x	4	x	11.0	T	27	27	27	27	69	69	119	119	170	170	221	221	272	272
17	6	x	4	x	12.0	I-T	5	5	28	28	70	70	120	120	171	171	222	222	273	273
18	6	x	6	x	15.0	I-T	19	19	42	42	84	84	134	134	185	185	236	236	287	287
19	6	x	4	x	16.0	I-T	28	28	28	28	70	70	120	120	171	171	222	222	273	273
20	6	x	6	x	20.0	I-T	43	43	43	43	85	85	135	135	186	186	237	237	288	288
21	7	x	5	x	11.0	T	13	13	36	36	78	78	128	128	179	179	230	230	281	281
22	7	x	5	x	13.0	T	36	36	36	36	78	78	128	128	179	179	230	230	281	281
23	7	x	6 3/4	x	15.0	T	47	47	47	47	89	89	139	139	190	190	241	241	292	292
24	7	x	6 3/4	x	17.0	T	47	47	47	47	89	89	139	139	190	190	241	241	292	292
25	7	x	6 3/4	x	19.0	T	47	47	47	47	89	89	139	139	190	190	241	241	292	292
26	7	x	8	x	21.5	T	56	56	56	56	100	100	150	150	201	201	252	252	303	303
27	7	x	8	x	24.0	T	56	56	56	56	100	100	150	150	201	201	252	252	303	303
28	8	x	4	x	10.0	I-T	6	6	29	29	71	71	121	121	172	172	223	223	274	274
29	8	x	4	x	13.0	I-T	6	6	29	29	71	71	121	121	172	172	223	223	274	274
30	8	x	5 1/2	x	13.0	T	16	16	39	39	81	81	131	131	182	182	233	233	284	284
31	8	x	4	x	15.0	I-T	7	7	30	30	72	72	122	122	173	173	224	224	275	275
32	8	x	5 1/2	x	15.5	T	39	39	39	39	81	81	131	131	182	182	233	233	284	284
33	8	x	5 1/4	x	18.0	I-T	17	17	40	40	82	82	132	132	183	183	234	234	285	285
34	8	x	7	x	18.0	T	52	52	52	52	95	95	145	145	196	196	247	247	298	298
35	8	x	7	x	20.0	T	52	52	52	52	95	95	145	145	196	196	247	247	298	298
36	8	x	5 1/4	x	21.0	I-T	17	17	40	40	82	82	132	132	183	183	234	234	285	285

TABLE VIII. Standard in-line bracket index. - Continued

NOMINAL SIZE OF BACKING MEMBER IN x IN x LBS/FT							THICKNESS OF SUPPORTED FLANGE (16ths in.)													
							3	4	5	6	7	8	9	10	11	12	13	14	15	16
38	8	x	6 1/4	x	24.0	I-T	21	21	48	48	90	90	140	140	191	191	242	242	293	293
39	8	x	7 1/8	x	25.0	T	95	95	95	95	95	95	145	145	196	196	247	247	298	298
40	8	x	6 1/2	x	28.0	I-T	48	48	48	48	90	90	140	140	191	191	242	242	293	293
41	8	x	7 1/8	x	28.5	T	94	94	94	94	94	94	144	144	195	195	246	246	297	297
42	8	x	8	x	31.0	I-T	57	57	57	57	101	101	151	151	202	202	253	253	304	304
43	9	x	6	x	17.5	T	44	44	44	44	86	86	136	136	187	187	238	238	289	289
44	9	x	6	x	20.0	T	44	44	44	44	86	86	136	136	187	187	238	238	289	289
45	10	x	4	x	12.0	I-T	8	8	31	31	73	73	123	123	174	174	225	225	276	276
46	10	x	4	x	15.0	I-T	8	8	31	31	73	73	123	123	174	174	225	225	276	276
47	10	x	4	x	17.0	I-T	9	9	32	32	74	74	124	124	175	175	226	226	277	277
48	10	x	4	x	19.0	I-T	9	9	32	32	74	74	124	124	175	175	226	226	277	277
49	10	x	5 3/4	x	22.0	I-T	20	20	45	45	87	87	137	137	188	188	239	239	290	290
50	10	x	5 3/4	x	26.0	I-T	45	45	45	45	87	87	137	137	188	188	239	239	290	290
51	10	x	5 3/4	x	30.0	I-T	45	45	45	45	87	87	137	137	188	188	239	239	290	290
52	10	x	8	x	33.0	I-T	59	59	59	59	103	103	153	153	204	204	255	255	306	306
53	10	x	8	x	39.0	I-T	58	58	58	58	102	102	152	152	203	203	254	254	305	305
54	10	x	8	x	45.0	I-T	59	59	59	59	103	103	153	153	204	204	255	255	306	306
55	12	x	4	x	14.0	I-T	10	10	33	33	75	75	125	125	176	176	227	227	278	278
56	12	x	4	x	16.0	I-T	10	10	33	33	75	75	125	125	176	176	227	227	278	278
57	12	x	4	x	19.0	I-T	11	11	34	34	76	76	126	126	177	177	228	228	279	279
58	12	x	4	x	22.0	I-T	34	34	34	34	76	76	126	126	177	177	228	228	279	279
59	12	x	6 1/2	x	26.0	I-T	22	22	49	49	91	91	141	141	192	192	243	243	294	294
60	12	x	6 1/2	x	30.0	I-T	49	49	49	49	91	91	141	141	192	192	243	243	294	294
61	12	x	6 1/2	x	35.0	I-T	49	49	49	49	91	91	141	141	192	192	243	243	294	294
62	12	x	8	x	40.0	I-T	60	60	60	60	104	104	154	154	205	205	256	256	307	307
63	12	x	8	x	45.0	I-T	60	60	60	60	104	104	154	154	205	205	256	256	307	307
64	12	x	8 1/8	x	50.0	I-T	61	61	61	61	105	105	155	155	206	206	257	257	308	308
65	12	x	10	x	53.0	I-T	63	63	63	63	109	109	159	159	210	210	261	261	312	312
66	12	x	10	x	58.0	I-T	64	64	64	64	110	110	160	160	211	211	262	262	313	313
67	14	x	5	x	22.0	I-T	14	14	37	37	79	79	129	129	180	180	231	231	282	282
68	14	x	5	x	26.0	I-T	37	37	37	37	79	79	129	129	180	180	231	231	282	282
69	14	x	6 3/4	x	30.0	I-T	50	50	50	50	92	92	142	142	193	193	244	244	295	295
70	14	x	6 3/4	x	34.0	I-T	51	51	51	51	93	93	143	143	194	194	245	245	296	296
71	14	x	6 3/4	x	38.0	I-T	51	51	51	51	93	93	143	143	194	194	245	245	296	296
72	14	x	8	x	43.0	I-T	62	62	62	62	106	106	156	156	207	207	258	258	309	309
73	14	x	8	x	48.0	I-T	62	62	62	62	106	106	156	156	207	207	258	258	309	309
74	16	x	5 1/2	x	26.0	I-T	18	18	41	41	83	83	133	133	184	184	235	235	286	286

TABLE VIII. Standard in-line bracket index. - Continued

	NOMINAL SIZE OF BACKING MEMBER IN x IN x LBS/FT	THICKNESS OF SUPPORTED FLANGE (16ths in.)													
		3	4	5	6	7	8	9	10	11	12	13	14	15	16
75	16 x 5 1/2 x 31.0 I-T	41	41	41	41	83	83	133	133	184	184	235	235	286	286
76	16 x 7 x 36.0 I-T	53	53	53	53	96	96	146	146	197	197	248	248	299	299
77	16 x 7 x 40.0 I-T	54	54	54	54	97	97	147	147	198	198	249	249	300	300
78	16 x 7 x 45.0 I-T	54	54	54	54	97	97	147	147	198	198	249	249	300	300
79	16 x 7 1/8 x 50.0 I-T	97	97	97	97	97	97	147	147	198	198	249	249	300	300
80	16 x 7 1/8 x 57.0 I-T	97	97	97	97	97	97	147	147	198	198	249	249	300	300
81	16 x 10 1/4 x 67.0 I-T	111	111	111	111	111	111	161	161	212	212	263	263	314	314
82	16 x 10 1/4 x 77.0 I-T	112	112	112	112	112	112	162	162	213	213	264	264	315	315
83	16 x 10 3/8 x 89.0 I-T	162	162	162	162	162	162	162	162	213	213	264	264	315	315
84	18 x 6 x 35.0 I-T	46	46	46	46	88	88	138	138	189	189	240	240	291	291
85	18 x 6 x 40.0 I-T	46	46	46	46	88	88	138	138	189	189	240	240	291	291
86	18 x 7 1/2 x 50.0 I-T	55	55	55	55	98	98	148	148	199	199	250	250	301	301
87	18 x 7 1/2 x 60.0 I-T	99	99	99	99	99	99	149	149	200	200	251	251	302	302
88	18 x 7 5/8 x 71.0 I-T	99	99	99	99	99	99	149	149	200	200	251	251	302	302
89	18 x 11 1/8 x 86.0 I-T	113	113	113	113	113	113	163	163	214	214	265	265	316	316
90	18 x 11 1/8 x 97.0 I-T	163	163	163	163	163	163	163	163	214	214	265	265	316	316
91	18 x 11 1/4 x 106.0 I-T	164	164	164	164	164	164	164	164	215	215	266	266	317	317
92	18 x 11 1/4 x 119.0 I-T	215	215	215	215	215	215	215	215	215	215	266	266	317	317
93	21 x 8 1/4 x 62.0 I-T	107	107	107	107	107	107	157	157	208	208	259	259	310	310
94	21 x 8 1/4 x 68.0 I-T	107	107	107	107	107	107	157	157	208	208	259	259	310	310
95	21 x 8 1/4 x 73.0 I-T	108	108	108	108	108	108	158	158	209	209	260	260	311	311
96	21 x 8 3/8 x 83.0 I-T	158	158	158	158	158	158	158	158	209	209	260	260	311	311
97	21 x 8 3/8 x 93.0 I-T	158	158	158	158	158	158	158	158	209	209	260	260	311	311
98	21 x 12 1/4 x 101.0 I-T	114	114	114	114	114	114	165	165	216	216	267	267	318	318
99	21 x 12 3/8 x 111.0 I-T	165	165	165	165	165	165	165	165	216	216	267	267	318	318

TABLE IX. Summary of standard in-line brackets.

IN-LINE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
1	3.5000	1.5000	0.7500	0.2500	6
2	4.5000	1.5000	0.7500	0.2500	8
3	5.5000	1.5000	0.5000	0.2500	2
4	5.5000	1.5000	0.7500	0.2500	6
5	5.7500	1.5000	0.5000	0.2500	2
6	7.5000	1.5000	0.7500	0.2500	4
7	7.7500	1.5000	0.7500	0.2500	2
8	9.5000	1.5000	0.7500	0.2500	4
9	9.7500	1.5000	0.7500	0.2500	4
10	11.5000	1.5000	0.7500	0.2500	4
11	11.7500	1.5000	0.7500	0.2500	2
12	4.5000	2.0000	0.7500	0.2500	2
13	6.5000	2.0000	0.7500	0.2500	2
14	13.2500	2.0000	0.7500	0.2500	2
15	3.5000	2.2500	0.7500	0.2500	2
16	7.5000	2.2500	1.0000	0.2500	2
17	7.7500	2.2500	0.7500	0.2500	4
18	15.2500	2.2500	1.0000	0.2500	2
19	5.5000	2.5000	0.5000	0.2500	2
20	9.7500	2.5000	0.7500	0.2500	2
21	7.5000	2.7500	0.7500	0.2500	2
22	11.7500	2.7500	0.7500	0.2500	2
23	3.5000	1.5000	0.7500	0.3750	6
24	3.7500	1.5000	0.5000	0.3750	4
25	4.5000	1.5000	0.7500	0.3750	8
26	5.5000	1.5000	0.5000	0.3750	2
27	5.5000	1.5000	0.7500	0.3750	10
28	5.7500	1.5000	0.5000	0.3750	6
29	7.5000	1.5000	0.7500	0.3750	4
30	7.7500	1.5000	0.7500	0.3750	2
31	9.5000	1.5000	0.7500	0.3750	4
32	9.7500	1.5000	0.7500	0.3750	4
33	11.5000	1.5000	0.7500	0.3750	4
34	11.7500	1.5000	0.7500	0.3750	6
35	4.5000	2.0000	0.7500	0.3750	6
36	6.5000	2.0000	0.7500	0.3750	6

TABLE IX. Summary of standard in-line brackets. - Continued

IN-LINE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
37	13.2500	2.0000	0.7500	0.3750	6
38	3.5000	2.2500	0.7500	0.3750	2
39	7.5000	2.2500	1.0000	0.3750	6
40	7.7500	2.2500	0.7500	0.3750	4
41	15.2500	2.2500	1.0000	0.3750	6
42	5.5000	2.5000	0.5000	0.3750	2
43	5.7500	2.5000	0.7500	0.3750	4
44	8.2500	2.5000	1.0000	0.3750	8
45	9.7500	2.5000	0.7500	0.3750	10
46	17.2500	2.5000	1.0000	0.3750	8
47	6.5000	2.7500	0.7500	0.3750	12
48	7.5000	2.7500	0.7500	0.3750	6
49	11.7500	2.7500	0.7500	0.3750	10
50	13.2500	2.7500	0.7500	0.3750	4
51	13.5000	2.7500	0.7500	0.3750	8
52	7.5000	3.0000	1.0000	0.3750	12
53	15.2500	3.0000	1.0000	0.3750	4
54	15.5000	3.0000	1.0000	0.3750	8
55	17.2500	3.2500	1.0000	0.3750	4
56	6.2500	3.5000	1.0000	0.3750	8
57	7.5000	3.5000	0.7500	0.3750	4
58	9.2500	3.5000	0.7500	0.3750	4
59	9.2500	3.5000	1.0000	0.3750	8
60	11.2500	3.5000	1.0000	0.3750	8
61	11.5000	3.5000	1.0000	0.3750	4
62	13.0000	3.5000	1.0000	0.3750	8
63	11.2500	4.5000	1.0000	0.3750	4
64	11.5000	4.5000	1.0000	0.3750	4
65	3.5000	1.5000	0.7500	0.5000	6
66	3.7500	1.5000	0.5000	0.5000	2
67	4.5000	1.5000	0.7500	0.5000	8
68	5.5000	1.5000	0.5000	0.5000	2
69	5.5000	1.5000	0.7500	0.5000	8
70	5.7500	1.5000	0.5000	0.5000	4
71	7.5000	1.5000	0.7500	0.5000	4
72	7.7500	1.5000	0.7500	0.5000	2

TABLE IX. Summary of standard in-line brackets. - Continued

IN-LINE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
73	9.5000	1.5000	0.7500	0.5000	4
74	9.7500	1.5000	0.7500	0.5000	4
75	11.5000	1.5000	0.7500	0.5000	4
76	11.7500	1.5000	0.7500	0.5000	4
77	4.5000	2.0000	0.7500	0.5000	4
78	6.5000	2.0000	0.7500	0.5000	4
79	13.2500	2.0000	0.7500	0.5000	4
80	3.5000	2.2500	0.7500	0.5000	2
81	7.5000	2.2500	1.0000	0.5000	4
82	7.7500	2.2500	0.7500	0.5000	4
83	15.2500	2.2500	1.0000	0.5000	4
84	5.5000	2.5000	0.5000	0.5000	2
85	5.7500	2.5000	0.7500	0.5000	2
86	8.2500	2.5000	1.0000	0.5000	4
87	9.7500	2.5000	0.7500	0.5000	6
88	17.2500	2.5000	1.0000	0.5000	4
89	6.5000	2.7500	0.7500	0.5000	6
90	7.5000	2.7500	0.7500	0.5000	4
91	11.7500	2.7500	0.7500	0.5000	6
92	13.2500	2.7500	0.7500	0.5000	2
93	13.5000	2.7500	0.7500	0.5000	4
94	7.5000	3.0000	0.7500	0.5000	6
95	7.5000	3.0000	1.0000	0.5000	12
96	15.2500	3.0000	1.0000	0.5000	2
97	15.5000	3.0000	1.0000	0.5000	16
98	17.2500	3.2500	1.0000	0.5000	2
99	17.5000	3.2500	1.0000	0.5000	12
100	6.2500	3.5000	1.0000	0.5000	4
101	7.5000	3.5000	0.7500	0.5000	2
102	9.2500	3.5000	0.7500	0.5000	2
103	9.2500	3.5000	1.0000	0.5000	4
104	11.2500	3.5000	1.0000	0.5000	4
105	11.5000	3.5000	1.0000	0.5000	2
106	13.0000	3.5000	1.0000	0.5000	4
107	20.2500	3.5000	1.0000	0.5000	12
108	20.5000	3.5000	1.0000	0.5000	6

TABLE IX. Summary of standard in-line brackets. - Continued

IN-LINE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
109	11.2500	4.5000	1.0000	0.5000	2
110	11.5000	4.5000	1.0000	0.5000	2
111	15.5000	4.5000	1.0000	0.5000	6
112	15.7500	4.5000	1.0000	0.5000	6
113	17.5000	5.0000	1.0000	0.5000	6
114	20.5000	5.5000	1.0000	0.5000	6
115	3.5000	1.5000	0.7500	0.6250	6
116	3.7500	1.5000	0.5000	0.6250	2
117	4.5000	1.5000	0.7500	0.6250	8
118	5.5000	1.5000	0.5000	0.6250	2
119	5.5000	1.5000	0.7500	0.6250	8
120	5.7500	1.5000	0.5000	0.6250	4
121	7.5000	1.5000	0.7500	0.6250	4
122	7.7500	1.5000	0.7500	0.6250	2
123	9.5000	1.5000	0.7500	0.6250	4
124	9.7500	1.5000	0.7500	0.6250	4
125	11.5000	1.5000	0.7500	0.6250	4
126	11.7500	1.5000	0.7500	0.6250	4
127	4.5000	2.0000	0.7500	0.6250	4
128	6.5000	2.0000	0.7500	0.6250	4
129	13.2500	2.0000	0.7500	0.6250	4
130	3.5000	2.2500	0.7500	0.6250	2
131	7.5000	2.2500	1.0000	0.6250	4
132	7.7500	2.2500	0.7500	0.6250	4
133	15.2500	2.2500	1.0000	0.6250	4
134	5.5000	2.5000	0.5000	0.6250	2
135	5.7500	2.5000	0.7500	0.6250	2
136	8.2500	2.5000	1.0000	0.6250	4
137	9.7500	2.5000	0.7500	0.6250	6
138	17.2500	2.5000	1.0000	0.6250	4
139	6.5000	2.7500	0.7500	0.6250	6
140	7.5000	2.7500	0.7500	0.6250	4
141	11.7500	2.7500	0.7500	0.6250	6
142	13.2500	2.7500	0.7500	0.6250	2
143	13.5000	2.7500	0.7500	0.6250	4
144	7.5000	3.0000	0.7500	0.6250	2

TABLE IX. Summary of standard in-line brackets. - Continued

IN-LINE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
145	7.5000	3.0000	1.0000	0.6250	8
146	15.2500	3.0000	1.0000	0.6250	2
147	15.5000	3.0000	1.0000	0.6250	8
148	17.2500	3.2500	1.0000	0.6250	2
149	17.5000	3.2500	1.0000	0.6250	4
150	6.2500	3.5000	1.0000	0.6250	4
151	7.5000	3.5000	0.7500	0.6250	2
152	9.2500	3.5000	0.7500	0.6250	2
153	9.2500	3.5000	1.0000	0.6250	4
154	11.2500	3.5000	1.0000	0.6250	4
155	11.5000	3.5000	1.0000	0.6250	2
156	13.0000	3.5000	1.0000	0.6250	4
157	20.2500	3.5000	1.0000	0.6250	4
158	20.5000	3.5000	1.0000	0.6250	18
159	11.2500	4.5000	1.0000	0.6250	2
160	11.5000	4.5000	1.0000	0.6250	2
161	15.5000	4.5000	1.0000	0.6250	2
162	15.7500	4.5000	1.0000	0.6250	10
163	17.5000	5.0000	1.0000	0.6250	10
164	17.7500	5.0000	1.0000	0.6250	8
165	20.5000	5.5000	1.0000	0.6250	10
166	3.5000	1.5000	0.7500	0.7500	6
167	3.7500	1.5000	0.5000	0.7500	2
168	4.5000	1.5000	0.7500	0.7500	8
169	5.5000	1.5000	0.5000	0.7500	2
170	5.5000	1.5000	0.7500	0.7500	8
171	5.7500	1.5000	0.5000	0.7500	4
172	7.5000	1.5000	0.7500	0.7500	4
173	7.7500	1.5000	0.7500	0.7500	2
174	9.5000	1.5000	0.7500	0.7500	4
175	9.7500	1.5000	0.7500	0.7500	4
176	11.5000	1.5000	0.7500	0.7500	4
177	11.7500	1.5000	0.	0.7500	4
178	4.5000	2.0000			

TABLE IX. Summary of standard in-line brackets. - Continued

IN-LINE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
181	3.5000	2.2500	0.7500	0.7500	2
182	7.5000	2.2500	1.0000	0.7500	4
183	7.7500	2.2500	0.7500	0.7500	4
184	15.2500	2.2500	1.0000	0.7500	4
185	5.5000	2.5000	0.5000	0.7500	2
186	5.7500	2.5000	0.7500	0.7500	2
187	8.2500	2.5000	1.0000	0.7500	4
188	9.7500	2.5000	0.7500	0.7500	6
189	17.2500	2.5000	1.0000	0.7500	4
190	6.5000	2.7500	0.7500	0.7500	6
191	7.5000	2.7500	0.7500	0.7500	4
192	11.7500	2.7500	0.7500	0.7500	6
193	13.2500	2.7500	0.7500	0.7500	2
194	13.5000	2.7500	0.7500	0.7500	4
195	7.5000	3.0000	0.7500	0.7500	2
196	7.5000	3.0000	1.0000	0.7500	8
197	15.2500	3.0000	1.0000	0.7500	2
198	15.5000	3.0000	1.0000	0.7500	8
199	17.2500	3.2500	1.0000	0.7500	2
200	17.5000	3.2500	1.0000	0.7500	4
201	6.2500	3.5000	1.0000	0.7500	4
202	7.5000	3.5000	0.7500	0.7500	2
203	9.2500	3.5000	0.7500	0.7500	2
204	9.2500	3.5000	1.0000	0.7500	4
205	11.2500	3.5000	1.0000	0.7500	4
206	11.5000	3.5000	1.0000	0.7500	2
207	13.0000	3.5000	1.0000	0.7500	4
208	20.2500	3.5000	1.0000	0.7500	4
209	20.5000	3.5000	1.0000	0.7500	4

TABLE IX. Summary of standard in-line brackets. - Continued

IN-LINE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
217	3.5000	1.5000	0.7500	0.8750	6
218	3.7500	1.5000	0.5000	0.8750	2
219	4.5000	1.5000	0.7500	0.8750	8
220	5.5000	1.5000	0.5000	0.8750	2
221	5.5000	1.5000	0.7500	0.8750	8
222	5.7500	1.5000	0.5000	0.8750	4
223	7.5000	1.5000	0.7500	0.8750	4
224	7.7500	1.5000	0.7500	0.8750	2
225	9.5000	1.5000	0.7500	0.8750	4
226	9.7500	1.5000	0.7500	0.8750	4
227	11.5000	1.5000	0.7500	0.8750	4
228	11.7500	1.5000	0.7500	0.8750	4
229	4.5000	2.0000	0.7500	0.8750	4
230	6.5000	2.0000	0.7500	0.8750	4
231	13.2500	2.0000	0.7500	0.8750	4
232	3.5000	2.2500	0.7500	0.8750	2
233	7.5000	2.2500	1.0000	0.8750	4
234	7.7500	2.2500	0.7500	0.8750	4
235	15.2500	2.2500	1.0000	0.8750	4
236	5.5000	2.5000	0.5000	0.8750	2
237	5.7500	2.5000	0.7500	0.8750	2
238	8.2500	2.5000	1.0000	0.8750	4
239	9.7500	2.5000	0.7500	0.8750	6
240	17.2500	2.5000	1.0000	0.8750	4
241	6.5000	2.7500	0.7500	0.8750	6
242	7.5000	2.7500	0.7500	0.8750	4
243	11.7500	2.7500	0.7500	0.8750	6
244	13.2500	2.7500	0.7500	0.8750	2
245	13.5000	2.7500	0.7500	0.8750	4
246	7.5000	3.0000	0.7500	0.8750	2
247	7.5000	3.0000	1.0000	0.8750	8
248	15.2500	3.0000	1.0000	0.8750	2
249	15.5000	3.0000	1.0000	0.8750	8
250	17.2500	3.2500	1.0000	0.8750	2
251	17.5000	3.2500	1.0000	0.8750	4
252	6.2500	3.5000	1.0000	0.8750	4

TABLE IX. Summary of standard in-line brackets. - Continued

IN-LINE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
253	7.5000	3.5000	0.7500	0.8750	2
254	9.2500	3.5000	0.7500	0.8750	2
255	9.2500	3.5000	1.0000	0.8750	4
256	11.2500	3.5000	1.0000	0.8750	4
257	11.5000	3.5000	1.0000	0.8750	2
258	13.0000	3.5000	1.0000	0.8750	4
259	20.2500	3.5000	1.0000	0.8750	4
260	20.5000	3.5000	1.0000	0.8750	6
261	11.2500	4.5000	1.0000	0.8750	2
262	11.5000	4.5000	1.0000	0.8750	2
263	15.5000	4.5000	1.0000	0.8750	2
264	15.7500	4.5000	1.0000	0.8750	4
265	17.5000	5.0000	1.0000	0.8750	4
266	17.7500	5.0000	1.0000	0.8750	4
267	20.5000	5.5000	1.0000	0.8750	4
268	3.5000	1.5000	0.7500	1.0000	6
269	3.7500	1.5000	0.5000	1.0000	2
270	4.5000	1.5000	0.7500	1.0000	8
271	5.5000	1.5000	0.5000	1.0000	2
272	5.5000	1.5000	0.7500	1.0000	8
273	5.7500	1.5000	0.5000	1.0000	4
274	7.5000	1.5000	0.7500	1.0000	4
275	7.7500	1.5000	0.7500	1.0000	2
276	9.5000	1.5000	0.7500	1.0000	4
277	9.7500	1.5000	0.7500	1.0000	4
278	11.5000	1.5000	0.7500	1.0000	4
279	11.7500	1.5000	0.7500	1.0000	4
280	4.5000	2.0000	0.7500	1.0000	4
281	6.5000	2.0000	0.7500	1.0000	4
282	13.2500	2.0000	0.7500	1.0000	4
283	3.5000	2.2500	0.7500	1.0000	2
284	7.5000	2.2500	1.0000	1.0000	4
285	7.7500	2.2500	0.7500	1.0000	4
286	15.2500	2.2500	1.0000	1.0000	4
287	5.5000	2.5000	0.5000	1.0000	2
288	5.7500	2.5000	0.7500	1.0000	2

TABLE IX. Summary of standard in-line brackets. - Continued

IN-LINE BRACKET ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
289	8.2500	2.5000	1.0000	1.0000	4
290	9.7500	2.5000	0.7500	1.0000	6
291	17.2500	2.5000	1.0000	1.0000	4
292	6.5000	2.7500	0.7500	1.0000	6
293	7.5000	2.7500	0.7500	1.0000	4
294	11.7500	2.7500	0.7500	1.0000	6
295	13.2500	2.7500	0.7500	1.0000	2
296	13.5000	2.7500	0.7500	1.0000	4
297	7.5000	3.0000	0.7500	1.0000	2
298	7.5000	3.0000	1.0000	1.0000	8
299	15.2500	3.0000	1.0000	1.0000	2
300	15.5000	3.0000	1.0000	1.0000	8
301	17.2500	3.2500	1.0000	1.0000	2
302	17.5000	3.2500	1.0000	1.0000	4
303	6.2500	3.5000	1.0000	1.0000	4
304	7.5000	3.5000	0.7500	1.0000	2
305	9.2500	3.5000	0.7500	1.0000	2
306	9.2500	3.5000	1.0000	1.0000	4
307	11.2500	3.5000	1.0000	1.0000	4
308	11.5000	3.5000	1.0000	1.0000	2
309	13.0000	3.5000	1.0000	1.0000	4
310	20.2500	3.5000	1.0000	1.0000	4
311	20.5000	3.5000	1.0000	1.0000	6
312	11.2500	4.5000	1.0000	1.0000	2
313	11.5000	4.5000	1.0000	1.0000	2
314	15.5000	4.5000	1.0000	1.0000	2
315	15.7500	4.5000	1.0000	1.0000	4
316	17.5000	5.0000	1.0000	1.0000	4
317	17.7500	5.0000	1.0000	1.0000	4
318	20.5000	5.5000	1.0000	1.0000	4

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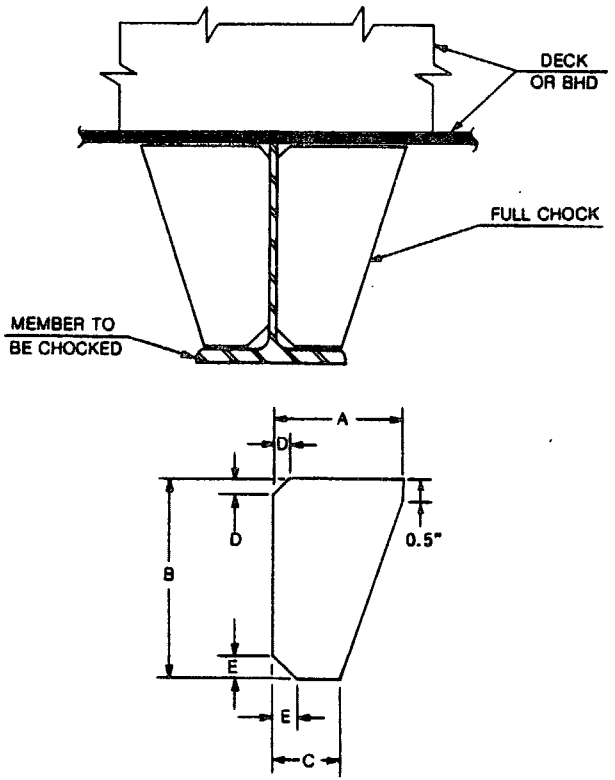
KEY DIAGRAM FOR FULL CHOCK



DETAIL FOR FULL CHOCK

Algorithms for Full Chock

A: $A = .625(d - t_f)$

* B: $B = d - t_f$

C: $C = .5(w_f - t_w) - .25"$

D: If member is a "T" _____ $D = t_w + .125"$

If member is an "I - T" _____ $D = k + .125"$

If $D \leq .5$ and

$A \geq 1.0"$ _____ $D = .5"$

E: $E = k - t_f - .125"$

If $E > .5C$ _____ $E = .5C$

If $E < .5"$ and

$C > 1.0"$ _____ $E = .5"$

T: $T = t_w$

If $T < .1875"$ _____ $T = .1875"$

NOTE:

1. d, t_f, w_f, k & t_w are dimensions of member to be chocked
2. * indicates a neat fit dimension
3. **Radius of $\frac{C}{2}$ is acceptable**

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FIGURE 7. Key diagram and algorithms for full chock.

TABLE X. Full chock - typical dimensions.

MEMBER TO BE CHOCKED							DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION E	PLATE THICKNESS	FULL CHOCK
IN	x	IN	x	LBS/FT			IN	IN	IN	IN	IN	IN	ID
1	4	x	4	x	5.0	T	2.5000	3.5000	1.5000	0.5000	0.7500	0.2500	1
2	4	x	4	x	6.5	T	2.5000	3.5000	1.5000	0.5000	0.7500	0.2500	1
3	4	x	4	x	7.5	T	2.5000	3.5000	1.5000	0.5000	0.7500	0.2500	1
4	4	x	5 1/4	x	9.0	T	2.5000	3.5000	2.2500	0.5000	0.7500	0.2500	2
5	4	x	4	x	13.0	I-T	2.5000	3.7500	1.5000	1.0000	0.5000	0.3750	25
6	5	x	4	x	6.0	T	3.0000	4.5000	1.5000	0.5000	0.7500	0.2500	3
7	5	x	4	x	7.5	T	3.0000	4.5000	1.5000	0.5000	0.7500	0.2500	3
8	5	x	4	x	8.5	T	3.0000	4.5000	1.5000	0.5000	0.7500	0.2500	3
9	5	x	4	x	9.5	T	3.0000	4.5000	1.5000	0.5000	0.7500	0.2500	3
10	5	x	5	x	16.0	I-T	3.0000	4.5000	2.0000	1.0000	0.7500	0.2500	4
11	5	x	5	x	19.0	I-T	3.0000	4.5000	2.0000	1.0000	0.7500	0.3750	26
12	6	x	4	x	7.0	T	4.0000	5.5000	1.5000	0.5000	0.7500	0.2500	5
13	6	x	4	x	7.0	T	4.0000	5.5000	1.5000	0.5000	0.7500	0.2500	5
14	6	x	4	x	9.0	I-T	4.0000	5.5000	1.5000	0.7500	0.5000	0.2500	6
15	6	x	4	x	9.5	T	4.0000	5.5000	1.5000	0.5000	0.7500	0.2500	5
16	6	x	4	x	11.0	T	4.0000	5.5000	1.5000	0.5000	0.7500	0.3750	27
17	6	x	4	x	12.0	I-T	4.0000	5.7500	1.5000	0.7500	0.5000	0.2500	8
18	6	x	6	x	15.0	I-T	4.0000	5.5000	2.5000	0.7500	0.5000	0.2500	7
19	6	x	4	x	16.0	I-T	4.0000	5.7500	1.5000	1.0000	0.5000	0.3750	28
20	6	x	6	x	20.0	I-T	4.0000	5.7500	2.5000	1.0000	0.7500	0.3750	29
21	7	x	5	x	11.0	T	4.5000	6.5000	2.0000	0.5000	0.7500	0.2500	9
22	7	x	5	x	13.0	T	4.5000	6.5000	2.0000	0.5000	0.7500	0.3750	31
23	7	x	6 3/4	x	15.0	T	4.5000	6.5000	2.7500	0.5000	0.7500	0.3750	32
24	7	x	6 3/4	x	17.0	T	4.5000	6.5000	2.7500	0.5000	0.7500	0.3750	32
25	7	x	6 3/4	x	19.0	T	4.5000	6.5000	2.7500	0.5000	0.7500	0.3750	32
26	7	x	8	x	21.5	T	4.0000	6.2500	3.5000	0.5000	1.0000	0.3750	30
27	7	x	8	x	24.0	T	4.0000	6.2500	3.5000	0.5000	1.0000	0.3750	30
28	8	x	4	x	10.0	I-T	5.0000	7.5000	1.5000	0.7500	0.7500	0.2500	10
29	8	x	4	x	13.0	I-T	5.0000	7.5000	1.5000	1.0000	0.7500	0.2500	11
30	8	x	5 1/2	x	13.0	T	5.0000	7.5000	2.2500	0.5000	1.0000	0.2500	12
31	8	x	4	x	15.0	I-T	5.0000	7.7500	1.5000	1.0000	0.7500	0.2500	14
32	8	x	5 1/2	x	15.5	T	5.0000	7.5000	2.2500	0.5000	1.0000	0.3750	33
33	8	x	5 1/4	x	18.0	I-T	5.0000	7.7500	2.2500	1.0000	0.7500	0.2500	15
34	8	x	7	x	18.0	T	5.0000	7.5000	3.0000	0.5000	1.0000	0.3750	35
35	8	x	7	x	20.0	T	5.0000	7.5000	3.0000	0.5000	1.0000	0.3750	35
36	8	x	5 1/4	x	21.0	I-T	5.0000	7.7500	2.2500	1.0000	0.7500	0.2500	15
37	8	x	7	x	22.5	T	5.0000	7.5000	3.0000	0.5000	1.0000	0.3750	35

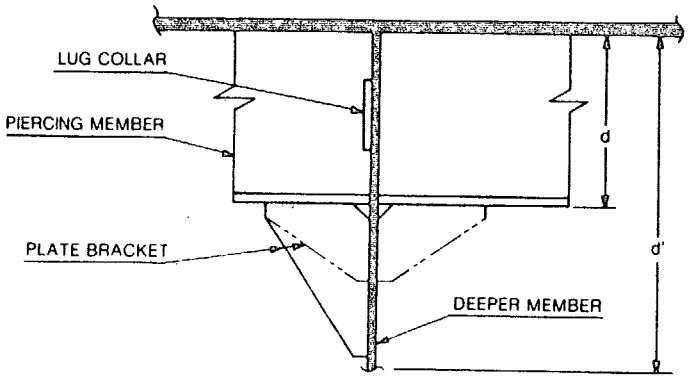
TABLE X. Full chock - typical dimensions. - Continued

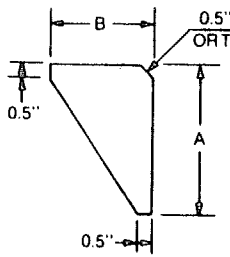
		MEMBER TO BE CHOCKED	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION E	PLATE THICKNESS	FULL CHOCK ID
		IN x IN x LBS/FT	IN	IN	IN	IN	IN	IN	
38	8	x 6 1/4 x 24.0 I-T	5.0000	7.5000	2.7500	1.0000	0.7500	0.2500	13
39	8	x 7 1/8 x 25.0 T	5.0000	7.5000	3.0000	0.7500	1.0000	0.5000	60
40	8	x 6 1/2 x 28.0 I-T	5.0000	7.5000	2.7500	1.2500	0.7500	0.3750	34
41	8	x 7 1/8 x 28.5 T	5.0000	7.5000	3.0000	0.7500	0.5000	0.5000	59
42	8	x 8 x 31.0 I-T	5.0000	7.5000	3.5000	1.2500	0.7500	0.3750	36
43	9	x 6 x 17.5 T	5.5000	8.2500	2.5000	0.5000	1.0000	0.3750	37
44	9	x 6 x 20.0 T	5.5000	8.2500	2.5000	0.5000	1.0000	0.3750	37
45	10	x 4 x 12.0 I-T	6.5000	9.5000	1.5000	0.7500	0.7500	0.2500	16
46	10	x 4 x 15.0 I-T	6.5000	9.5000	1.5000	1.0000	0.7500	0.2500	17
47	10	x 4 x 17.0 I-T	6.5000	9.7500	1.5000	1.0000	0.7500	0.2500	18
48	10	x 4 x 19.0 I-T	6.5000	9.7500	1.5000	1.0000	0.7500	0.2500	18
49	10	x 5 3/4 x 22.0 I-T	6.5000	9.7500	2.5000	1.0000	0.7500	0.2500	19
50	10	x 5 3/4 x 26.0 I-T	6.5000	9.7500	2.5000	1.0000	0.7500	0.3750	41
51	10	x 5 3/4 x 30.0 I-T	6.5000	9.7500	2.5000	1.2500	0.7500	0.3750	42
52	10	x 8 x 33.0 I-T	6.0000	9.2500	3.5000	1.2500	1.0000	0.3750	39
53	10	x 8 x 39.0 I-T	6.0000	9.2500	3.5000	1.2500	0.7500	0.3750	38
54	10	x 8 x 45.0 I-T	6.0000	9.2500	3.5000	1.5000	1.0000	0.3750	40
55	12	x 4 x 14.0 I-T	7.5000	11.5000	1.5000	1.0000	0.7500	0.2500	20
56	12	x 4 x 16.0 I-T	7.5000	11.5000	1.5000	1.0000	0.7500	0.2500	20
57	12	x 4 x 19.0 I-T	7.5000	11.7500	1.5000	1.0000	0.7500	0.2500	21
58	12	x 4 x 22.0 I-T	7.5000	11.7500	1.5000	1.0000	0.7500	0.3750	47
59	12	x 6 1/2 x 26.0 I-T	7.5000	11.7500	2.7500	1.0000	0.7500	0.2500	22
60	12	x 6 1/2 x 30.0 I-T	7.5000	11.7500	2.7500	1.2500	0.7500	0.3750	48
61	12	x 6 1/2 x 35.0 I-T	7.5000	11.7500	2.7500	1.2500	0.7500	0.3750	48
62	12	x 8 x 40.0 I-T	7.5000	11.2500	3.5000	1.5000	1.0000	0.3750	43
63	12	x 8 x 45.0 I-T	7.5000	11.2500	3.5000	1.5000	1.0000	0.3750	43
64	12	x 8 1/8 x 50.0 I-T	7.5000	11.5000	3.5000	1.5000	1.0000	0.3750	45
65	12	x 10 x 53.0 I-T	7.5000	11.2500	4.5000	1.5000	1.0000	0.3750	44
66	12	x 10 x 58.0 I-T	7.5000	11.5000	4.5000	1.5000	1.0000	0.3750	46
67	14	x 5 x 22.0 I-T	8.5000	13.2500	2.0000	1.0000	0.7500	0.2500	23
68	14	x 5 x 26.0 I-T	8.5000	13.2500	2.0000	1.2500	0.7500	0.3750	50
69	14	x 6 3/4 x 30.0 I-T	8.5000	13.2500	2.7500	1.2500	0.7500	0.3750	51
70	14	x 6 3/4 x 34.0 I-T	8.5000	13.5000	2.7500	1.2500	0.7500	0.3750	52
71	14	x 6 3/4 x 38.0 I-T	8.5000	13.5000	2.7500	1.2500	0.7500	0.3750	52
72	14	x 8 x 43.0 I-T	8.5000	13.0000	3.5000	1.5000	1.0000	0.3750	49
73	14	x 8 x 48.0 I-T	8.5000	13.0000	3.5000	1.5000	1.0000	0.3750	49
74	16	x 5 1/2 x 26.0 I-T	10.0000	15.2500	2.2500	1.2500	1.0000	0.2500	24

TABLE X. Full chock - typical dimensions. - Continued

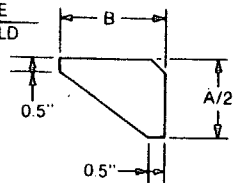
	MEMBER TO BE CHOCKED			DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION E	PLATE THICKNESS	FULL CHOCK ID
	IN	x IN	x LBS/FT	IN	IN	IN	IN	IN	IN	
75	16	x 5 1/2	x 31.0 I-T	10.0000	15.2500	2.2500	1.2500	1.0000	0.3750	53
76	16	x 7	x 36.0 I-T	10.0000	15.2500	3.0000	1.2500	1.0000	0.3750	54
77	16	x 7	x 40.0 I-T	10.0000	15.5000	3.0000	1.5000	1.0000	0.3750	55
78	16	x 7	x 45.0 I-T	10.0000	15.5000	3.0000	1.5000	1.0000	0.3750	55
79	16	x 7 1/8	x 50.0 I-T	10.0000	15.5000	3.0000	1.5000	1.0000	0.5000	61
80	16	x 7 1/8	x 57.0 I-T	10.0000	15.5000	3.0000	1.5000	1.0000	0.5000	61
81	16	x 10 1/4	x 67.0 I-T	10.0000	15.5000	4.5000	1.5000	1.0000	0.5000	62
82	16	x 10 1/4	x 77.0 I-T	10.0000	15.7500	4.5000	1.7500	1.0000	0.5000	63
83	16	x 10 3/8	x 89.0 I-T	10.0000	15.7500	4.5000	1.7500	1.0000	0.6250	71
84	18	x 6	x 35.0 I-T	11.0000	17.2500	2.5000	1.2500	1.0000	0.3750	56
85	18	x 6	x 40.0 I-T	11.0000	17.2500	2.5000	1.5000	1.0000	0.3750	57
86	18	x 7 1/2	x 50.0 I-T	11.0000	17.2500	3.2500	1.5000	1.0000	0.3750	58
87	18	x 7 1/2	x 60.0 I-T	11.0000	17.5000	3.2500	1.5000	1.0000	0.5000	64
88	18	x 7 5/8	x 71.0 I-T	11.5000	17.5000	3.2500	1.7500	1.0000	0.5000	65
89	18	x 11 1/8	x 86.0 I-T	11.5000	17.5000	5.0000	1.7500	1.0000	0.5000	66
90	18	x 11 1/8	x 97.0 I-T	11.5000	17.5000	5.0000	1.7500	1.0000	0.6250	72
91	18	x 11 1/4	x106.0 I-T	11.5000	17.7500	5.0000	1.7500	1.0000	0.6250	73
92	18	x 11 1/4	x119.0 I-T	11.5000	17.7500	5.0000	2.0000	1.0000	0.7500	77
93	21	x 8 1/4	x 62.0 I-T	13.0000	20.2500	3.5000	1.5000	1.0000	0.5000	67
94	21	x 8 1/4	x 68.0 I-T	13.0000	20.2500	3.5000	1.7500	1.0000	0.5000	68
95	21	x 8 1/4	x 73.0 I-T	13.0000	20.5000	3.5000	1.7500	1.0000	0.5000	69
96	21	x 8 3/8	x 83.0 I-T	13.0000	20.5000	3.5000	1.7500	1.0000	0.6250	74
97	21	x 8 3/8	x 93.0 I-T	13.0000	20.5000	3.5000	2.0000	1.0000	0.6250	75
98	21	x 12 1/4	x101.0 I-T	13.0000	20.5000	5.5000	1.7500	1.0000	0.5000	70
99	21	x 12 3/8	x111.0 I-T	13.0000	20.5000	5.5000	1.7500	1.0000	0.6250	76

KEY DIAGRAM FOR PLATE BRACKET





DETAIL
FOR BRACKET
ONE SIDE ONLY



DETAIL
FOR BRACKET
ON BOTH SIDES

Algorithms for Plate Bracket

A:

If $\frac{d}{d'} \geq .6$ _____ $A = \frac{1}{1.25}d$

If $.33 < \frac{d}{d'} < .6$ _____ $A = \frac{1}{1.55}d$

If $\frac{d}{d'} \leq .33$ _____ $A = \frac{1}{1.1}d$

B: $B = \frac{1}{1.66}d$

T: $T = t_w$

If $T < .1875"$ _____ $T = .1875"$

NOTE:

1. d & t_w are dimensions of piercing member
2. d' is the depth of the deeper member
3. **Radius of $\frac{C}{2}$ is acceptable**

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FIGURE 8. Key diagram and algorithms for plate bracket.

TABLE XI. Plate bracket - typical dimensions.

PIERCING MEMBER IN x IN x LBS/FT							DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	PLATE BRACKET ID
1	4	x	4	x	5.0	T	d/d'>.60	4.0000	2.5000	0.2500	2
							.33<d/d'<.60	3.0000	2.5000	0.2500	1
							d/d'<.33	4.0000	2.5000	0.2500	2
2	4	x	4	x	6.5	T	d/d'>.60	4.0000	2.5000	0.2500	2
							.33<d/d'<.60	3.0000	2.5000	0.2500	1
							d/d'<.33	4.0000	2.5000	0.2500	2
3	4	x	4	x	7.5	T	d/d'>.60	4.0000	2.5000	0.2500	2
							.33<d/d'<.60	3.0000	2.5000	0.2500	1
							d/d'<.33	4.0000	2.5000	0.2500	2
4	4	x	5 1/4	x	9.0	T	d/d'>.60	4.0000	2.5000	0.2500	2
							.33<d/d'<.60	3.0000	2.5000	0.2500	1
							d/d'<.33	4.0000	2.5000	0.2500	2
5	4	x	4	x	13.0	I-T	d/d'>.60	4.0000	3.0000	0.3750	34
							.33<d/d'<.60	3.0000	3.0000	0.3750	33
							d/d'<.33	4.0000	3.0000	0.3750	34
6	5	x	4	x	6.0	T	d/d'>.60	4.0000	3.0000	0.2500	3
							.33<d/d'<.60	4.0000	3.0000	0.2500	3
							d/d'<.33	5.0000	3.0000	0.2500	4
7	5	x	4	x	7.5	T	d/d'>.60	4.0000	3.5000	0.2500	5
							.33<d/d'<.60	4.0000	3.5000	0.2500	5
							d/d'<.33	5.0000	3.5000	0.2500	6
8	5	x	4	x	8.5	T	d/d'>.60	5.0000	3.5000	0.2500	6
							.33<d/d'<.60	4.0000	3.5000	0.2500	5
							d/d'<.33	5.0000	3.5000	0.2500	6
9	5	x	4	x	9.5	T	d/d'>.60	5.0000	3.5000	0.2500	6
							.33<d/d'<.60	4.0000	3.5000	0.2500	5
							d/d'<.33	5.0000	3.5000	0.2500	6
10	5	x	5	x	16.0	I-T	d/d'>.60	5.0000	3.5000	0.2500	6
							.33<d/d'<.60	4.0000	3.5000	0.2500	5
							d/d'<.33	5.0000	3.5000	0.2500	6

TABLE XI. Plate bracket - typical dimensions. - Continued

PIERCING MEMBER IN x IN x LBS/FT						DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	PLATE BRACKET ID
11	5	x	5	x	19.0 I-T	d/d'>.60	5.0000	3.5000	0.3750	36
						.33<d/d'<.60	4.0000	3.5000	0.3750	35
						d/d'<.33	5.0000	3.5000	0.3750	36
12	6	x	4	x	7.0 T	d/d'>.60	5.0000	4.0000	0.2500	8
						.33<d/d'<.60	4.0000	4.0000	0.2500	7
						d/d'<.33	6.0000	4.0000	0.2500	9
13	6	x	4	x	7.0 T	d/d'>.60	5.0000	4.0000	0.2500	8
						.33<d/d'<.60	4.0000	4.0000	0.2500	7
						d/d'<.33	6.0000	4.0000	0.2500	9
14	6	x	4	x	9.0 I-T	d/d'>.60	5.0000	4.0000	0.2500	8
						.33<d/d'<.60	4.0000	4.0000	0.2500	7
						d/d'<.33	6.0000	4.0000	0.2500	9
15	6	x	4	x	9.5 T	d/d'>.60	5.0000	4.0000	0.2500	8
						.33<d/d'<.60	4.0000	4.0000	0.2500	7
						d/d'<.33	6.0000	4.0000	0.2500	9
16	6	x	4	x	11.0 T	d/d'>.60	5.0000	4.0000	0.3750	38
						.33<d/d'<.60	4.0000	4.0000	0.3750	37
						d/d'<.33	6.0000	4.0000	0.3750	39
17	6	x	4	x	12.0 I-T	d/d'>.60	5.0000	4.0000	0.2500	8
						.33<d/d'<.60	4.0000	4.0000	0.2500	7
						d/d'<.33	6.0000	4.0000	0.2500	9
18	6	x	6	x	15.0 I-T	d/d'>.60	5.0000	4.0000	0.2500	8
						.33<d/d'<.60	4.0000	4.0000	0.2500	7
						d/d'<.33	6.0000	4.0000	0.2500	9
19	6	x	4	x	16.0 I-T	d/d'>.60	6.0000	4.0000	0.3750	39
						.33<d/d'<.60	5.0000	4.0000	0.3750	38
						d/d'<.33	6.0000	4.0000	0.3750	39
20	6	x	6	x	20.0 I-T	d/d'>.60	5.0000	4.0000	0.3750	38
						.33<d/d'<.60	4.0000	4.0000	0.3750	37
						d/d'<.33	6.0000	4.0000	0.3750	39

TABLE XI. Plate bracket - typical dimensions. - Continued

PIERCING MEMBER IN x IN x LBS/FT						DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	PLATE BRACKET ID
21	7	x	5	x	11.0 T	d/d'>.60	6.0000	4.5000	0.2500	11
						.33<d/d'<.60	5.0000	4.5000	0.2500	10
						d/d'<.33	7.0000	4.5000	0.2500	12
22	7	x	5	x	13.0 T	d/d'>.60	6.0000	4.5000	0.3750	41
						.33<d/d'<.60	5.0000	4.5000	0.3750	40
						d/d'<.33	7.0000	4.5000	0.3750	42
23	7	x	6 3/4	x	15.0 T	d/d'>.60	6.0000	4.5000	0.3750	41
						.33<d/d'<.60	5.0000	4.5000	0.3750	40
						d/d'<.33	7.0000	4.5000	0.3750	42
24	7	x	6 3/4	x	17.0 T	d/d'>.60	6.0000	4.5000	0.3750	41
						.33<d/d'<.60	5.0000	4.5000	0.3750	40
						d/d'<.33	7.0000	4.5000	0.3750	42
25	7	x	6 3/4	x	19.0 T	d/d'>.60	6.0000	4.5000	0.3750	41
						.33<d/d'<.60	5.0000	4.5000	0.3750	40
						d/d'<.33	7.0000	4.5000	0.3750	42
26	7	x	8	x	21.5 T	d/d'>.60	6.0000	4.5000	0.3750	41
						.33<d/d'<.60	5.0000	4.5000	0.3750	40
						d/d'<.33	7.0000	4.5000	0.3750	42
27	7	x	8	x	24.0 T	d/d'>.60	6.0000	4.5000	0.3750	41
						.33<d/d'<.60	5.0000	4.5000	0.3750	40
						d/d'<.33	7.0000	4.5000	0.3750	42
28	8	x	4	x	10.0 I-T	d/d'>.60	7.0000	5.0000	0.2500	14
						.33<d/d'<.60	6.0000	5.0000	0.2500	13
						d/d'<.33	8.0000	5.0000	0.2500	15
29	8	x	4	x	13.0 I-T	d/d'>.60	7.0000	5.0000	0.2500	14
						.33<d/d'<.60	6.0000	5.0000	0.2500	13
						d/d'<.33	8.0000	5.0000	0.2500	15
30	8	x	5 1/2	x	13.0 T	d/d'>.60	7.0000	5.0000	0.2500	14
						.33<d/d'<.60	6.0000	5.0000	0.2500	13
						d/d'<.33	8.0000	5.0000	0.2500	15

TABLE XI. Plate bracket - typical dimensions. - Continued

	PIERCING MEMBER			DEPTH RATIO	DIMENSION A	DIMENSION B	PLATE THICKNESS	PLATE BRACKET ID
	IN x IN x LBS/FT				IN	IN	IN	
31	8	x 4	x 15.0 I-T	d/d'>.60	7.0000	5.0000	0.2500	14
				.33<d/d'<.60	6.0000	5.0000	0.2500	13
				d/d'<.33	8.0000	5.0000	0.2500	15
32	8	x 5 1/2	x 15.5 T	d/d'>.60	7.0000	5.0000	0.3750	44
				.33<d/d'<.60	6.0000	5.0000	0.3750	43
				d/d'<.33	8.0000	5.0000	0.3750	45
33	8	x 5 1/4	x 18.0 I-T	d/d'>.60	7.0000	5.0000	0.2500	14
				.33<d/d'<.60	6.0000	5.0000	0.2500	13
				d/d'<.33	8.0000	5.0000	0.2500	15
34	8	x 7	x 18.0 T	d/d'>.60	7.0000	5.0000	0.3750	44
				.33<d/d'<.60	6.0000	5.0000	0.3750	43
				d/d'<.33	8.0000	5.0000	0.3750	45
35	8	x 7	x 20.0 T	d/d'>.60	7.0000	5.0000	0.3750	44
				.33<d/d'<.60	6.0000	5.0000	0.3750	43
				d/d'<.33	8.0000	5.0000	0.3750	45
36	8	x 5 1/4	x 21.0 I-T	d/d'>.60	7.0000	5.0000	0.2500	14
				.33<d/d'<.60	6.0000	5.0000	0.2500	13
				d/d'<.33	8.0000	5.0000	0.2500	15
37	8	x 7	x 22.5 T	d/d'>.60	7.0000	5.0000	0.3750	44
				.33<d/d'<.60	6.0000	5.0000	0.3750	43
				d/d'<.33	8.0000	5.0000	0.3750	45
38	8	x 6 1/4	x 24.0 I-T	d/d'>.60	7.0000	5.0000	0.2500	14
				.33<d/d'<.60	6.0000	5.0000	0.2500	13
				d/d'<.33	8.0000	5.0000	0.2500	15
39	8	x 7 1/8	x 25.0 T	d/d'>.60	7.0000	5.0000	0.5000	75
				.33<d/d'<.60	6.0000	5.0000	0.5000	74
				d/d'<.33	8.0000	5.0000	0.5000	76
40	8	x 6 1/2	x 28.0 I-T	d/d'>.60	7.0000	5.0000	0.3750	44
				.33<d/d'<.60	6.0000	5.0000	0.3750	43
				d/d'<.33	8.0000	5.0000	0.3750	45

TABLE XI. Plate bracket - typical dimensions. - Continued

PIERCING MEMBER						DEPTH RATIO	DIMENSION A	DIMENSION B	PLATE THICKNESS	PLATE BRACKET
IN	x	IN	x	LBS/FT			IN	IN	IN	ID
41	8	x	7 1/8	x	28.5 T	d/d'>.60	7.0000	5.0000	0.5000	75
						.33<d/d'<.60	6.0000	5.0000	0.5000	74
						d/d'<.33	8.0000	5.0000	0.5000	76
42	8	x	8	x	31.0 I-T	d/d'>.60	7.0000	5.0000	0.3750	44
						.33<d/d'<.60	6.0000	5.0000	0.3750	43
						d/d'<.33	8.0000	5.0000	0.3750	45
43	9	x	6	x	17.5 T	d/d'>.60	8.0000	5.5000	0.3750	47
						.33<d/d'<.60	6.0000	5.5000	0.3750	46
						d/d'<.33	8.0000	5.5000	0.3750	47
44	9	x	6	x	20.0 T	d/d'>.60	8.0000	5.5000	0.3750	47
						.33<d/d'<.60	6.0000	5.5000	0.3750	46
						d/d'<.33	9.0000	5.5000	0.3750	48
45	10	x	4	x	12.0 I-T	d/d'>.60	8.0000	6.0000	0.2500	17
						.33<d/d'<.60	7.0000	6.0000	0.2500	16
						d/d'<.33	9.0000	6.0000	0.2500	18
46	10	x	4	x	15.0 I-T	d/d'>.60	8.0000	6.5000	0.2500	20
						.33<d/d'<.60	7.0000	6.5000	0.2500	19
						d/d'<.33	9.0000	6.5000	0.2500	21
47	10	x	4	x	17.0 I-T	d/d'>.60	9.0000	6.5000	0.2500	21
						.33<d/d'<.60	7.0000	6.5000	0.2500	19
						d/d'<.33	10.0000	6.5000	0.2500	22
48	10	x	4	x	19.0 I-T	d/d'>.60	9.0000	6.5000	0.2500	21
						.33<d/d'<.60	7.0000	6.5000	0.2500	19
						d/d'<.33	10.0000	6.5000	0.2500	22
49	10	x	5 3/4	x	22.0 I-T	d/d'>.60	9.0000	6.5000	0.2500	21
						.33<d/d'<.60	7.0000	6.5000	0.2500	19
						d/d'<.33	10.0000	6.5000	0.2500	22
50	10	x	5 3/4	x	26.0 I-T	d/d'>.60	9.0000	6.5000	0.3750	53
						.33<d/d'<.60	7.0000	6.5000	0.3750	52
						d/d'<.33	10.0000	6.5000	0.3750	54

TABLE XI. Plate bracket - typical dimensions. - Continued

PIERCING MEMBER IN x IN x LBS/FT				DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	PLATE BRACKET ID
51	10	x 5 3/4	x 30.0 I-T	d/d'>.60	9.0000	6.5000	0.3750	53
				.33<d/d'<.60	7.0000	6.5000	0.3750	52
				d/d'<.33	10.0000	6.5000	0.3750	54
52	10	x 8	x 33.0 I-T	d/d'>.60	8.0000	6.0000	0.3750	50
				.33<d/d'<.60	7.0000	6.0000	0.3750	49
				d/d'<.33	9.0000	6.0000	0.3750	51
53	10	x 8	x 39.0 I-T	d/d'>.60	8.0000	6.0000	0.3750	50
				.33<d/d'<.60	7.0000	6.0000	0.3750	49
				d/d'<.33	9.0000	6.0000	0.3750	51
54	10	x 8	x 45.0 I-T	d/d'>.60	9.0000	6.5000	0.3750	53
				.33<d/d'<.60	7.0000	6.5000	0.3750	52
				d/d'<.33	10.0000	6.5000	0.3750	54
55	12	x 4	x 14.0 I-T	d/d'>.60	10.0000	7.5000	0.2500	24
				.33<d/d'<.60	8.0000	7.5000	0.2500	23
				d/d'<.33	11.0000	7.5000	0.2500	25
56	12	x 4	x 16.0 I-T	d/d'>.60	10.0000	7.5000	0.2500	24
				.33<d/d'<.60	8.0000	7.5000	0.2500	23
				d/d'<.33	11.0000	7.5000	0.2500	25
57	12	x 4	x 19.0 I-T	d/d'>.60	10.0000	7.5000	0.2500	24
				.33<d/d'<.60	8.0000	7.5000	0.2500	23
				d/d'<.33	11.0000	7.5000	0.2500	25
58	12	x 4	x 22.0 I-T	d/d'>.60	10.0000	7.5000	0.3750	56
				.33<d/d'<.60	8.0000	7.5000	0.3750	55
				d/d'<.33	12.0000	7.5000	0.3750	58
59	12	x 6 1/2	x 26.0 I-T	d/d'>.60	10.0000	7.5000	0.2500	24
				.33<d/d'<.60	8.0000	7.5000	0.2500	23
				d/d'<.33	12.0000	7.5000	0.2500	26
60	12	x 6 1/2	x 30.0 I-T	d/d'>.60	10.0000	7.5000	0.3750	56
				.33<d/d'<.60	8.0000	7.5000	0.3750	55
				d/d'<.33	12.0000	7.5000	0.3750	58

TABLE XI. Plate bracket - typical dimensions. - Continued

PIERCING MEMBER						DEPTH RATIO	DIMENSION A	DIMENSION B	PLATE THICKNESS	PLATE BRACKET
IN	x	IN	x	LBS/FT			IN	IN	IN	ID
61	12	x	6 1/2	x	35.0 I-T	d/d'>.60	10.0000	8.0000	0.3750	60
						.33<d/d'<.60	9.0000	8.0000	0.3750	59
						d/d'<.33	12.0000	8.0000	0.3750	61
62	12	x	8	x	40.0 I-T	d/d'>.60	10.0000	7.5000	0.3750	56
						.33<d/d'<.60	8.0000	7.5000	0.3750	55
						d/d'<.33	11.0000	7.5000	0.3750	57
63	12	x	8	x	45.0 I-T	d/d'>.60	10.0000	7.5000	0.3750	56
						.33<d/d'<.60	8.0000	7.5000	0.3750	55
						d/d'<.33	11.0000	7.5000	0.3750	57
64	12	x	8 1/8	x	50.0 I-T	d/d'>.60	10.0000	7.5000	0.3750	56
						.33<d/d'<.60	8.0000	7.5000	0.3750	55
						d/d'<.33	11.0000	7.5000	0.3750	57
65	12	x	10	x	53.0 I-T	d/d'>.60	10.0000	7.5000	0.3750	56
						.33<d/d'<.60	8.0000	7.5000	0.3750	55
						d/d'<.33	11.0000	7.5000	0.3750	57
66	12	x	10	x	58.0 I-T	d/d'>.60	10.0000	7.5000	0.3750	56
						.33<d/d'<.60	8.0000	7.5000	0.3750	55
						d/d'<.33	11.0000	7.5000	0.3750	57
67	14	x	5	x	22.0 I-T	d/d'>.60	11.0000	8.5000	0.2500	28
						.33<d/d'<.60	9.0000	8.5000	0.2500	27
						d/d'<.33	13.0000	8.5000	0.2500	29
68	14	x	5	x	26.0 I-T	d/d'>.60	12.0000	8.5000	0.3750	65
						.33<d/d'<.60	9.0000	8.5000	0.3750	62
						d/d'<.33	13.0000	8.5000	0.3750	66
69	14	x	6 3/4	x	30.0 I-T	d/d'>.60	12.0000	8.5000	0.3750	65
						.33<d/d'<.60	9.0000	8.5000	0.3750	62
						d/d'<.33	13.0000	8.5000	0.3750	66
70	14	x	6 3/4	x	34.0 I-T	d/d'>.60	12.0000	8.5000	0.3750	65
						.33<d/d'<.60	10.0000	8.5000	0.3750	63
						d/d'<.33	13.0000	8.5000	0.3750	66

TABLE XI. Plate bracket - typical dimensions. - Continued

PIERCING MEMBER IN x IN x LBS/FT	DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	PLATE BRACKET ID
71 14 x 6 3/4 x 38.0 I-T	d/d'>.60	12.0000	8.5000	0.3750	65
	.33<d/d'<.60	10.0000	8.5000	0.3750	63
	d/d'<.33	13.0000	8.5000	0.3750	66
72 14 x 8 x 43.0 I-T	d/d'>.60	11.0000	8.5000	0.3750	64
	.33<d/d'<.60	9.0000	8.5000	0.3750	62
	d/d'<.33	13.0000	8.5000	0.3750	66
73 14 x 8 x 48.0 I-T	d/d'>.60	12.0000	8.5000	0.3750	65
	.33<d/d'<.60	9.0000	8.5000	0.3750	62
	d/d'<.33	13.0000	8.5000	0.3750	66
74 16 x 5 1/2 x 26.0 I-T	d/d'>.60	13.0000	9.5000	0.2500	31
	.33<d/d'<.60	11.0000	9.5000	0.2500	30
	d/d'<.33	15.0000	9.5000	0.2500	32
75 16 x 5 1/2 x 31.0 I-T	d/d'>.60	13.0000	10.0000	0.3750	68
	.33<d/d'<.60	11.0000	10.0000	0.3750	67
	d/d'<.33	15.0000	10.0000	0.3750	69
76 16 x 7 x 36.0 I-T	d/d'>.60	13.0000	10.0000	0.3750	68
	.33<d/d'<.60	11.0000	10.0000	0.3750	67
	d/d'<.33	15.0000	10.0000	0.3750	69
77 16 x 7 x 40.0 I-T	d/d'>.60	13.0000	10.0000	0.3750	68
	.33<d/d'<.60	11.0000	10.0000	0.3750	67
	d/d'<.33	15.0000	10.0000	0.3750	69
78 16 x 7 x 45.0 I-T	d/d'>.60	13.0000	10.0000	0.3750	68
	.33<d/d'<.60	11.0000	10.0000	0.3750	67
	d/d'<.33	15.0000	10.0000	0.3750	69
79 16 x 7 1/8 x 50.0 I-T	d/d'>.60	14.0000	10.0000	0.5000	78
	.33<d/d'<.60	11.0000	10.0000	0.5000	77
	d/d'<.33	15.0000	10.0000	0.5000	79
80 16 x 7 1/8 x 57.0 I-T	d/d'>.60	14.0000	10.0000	0.5000	78
	.33<d/d'<.60	11.0000	10.0000	0.5000	77
	d/d'<.33	15.0000	10.0000	0.5000	79

TABLE XI. Plate bracket - typical dimensions. - Continued

PIERCING MEMBER					DEPTH RATIO	DIMENSION A	DIMENSION B	PLATE THICKNESS	PLATE BRACKET
IN	x	IN	x	LBS/FT		IN	IN	IN	ID
81	16	x 10 1/4	x	67.0 I-T	d/d'>.60	14.0000	10.0000	0.5000	78
					.33<d/d'<.60	11.0000	10.0000	0.5000	77
					d/d'<.33	15.0000	10.0000	0.5000	79
82	16	x 10 1/4	x	77.0 I-T	d/d'>.60	14.0000	10.0000	0.5000	78
					.33<d/d'<.60	11.0000	10.0000	0.5000	77
					d/d'<.33	15.0000	10.0000	0.5000	79
83	16	x 10 3/8	x	89.0 I-T	d/d'>.60	14.0000	10.5000	0.6250	92
					.33<d/d'<.60	11.0000	10.5000	0.6250	91
					d/d'<.33	16.0000	10.5000	0.6250	93
84	18	x 6	x	35.0 I-T	d/d'>.60	15.0000	11.0000	0.3750	71
					.33<d/d'<.60	12.0000	11.0000	0.3750	70
					d/d'<.33	16.0000	11.0000	0.3750	72
85	18	x 6	x	40.0 I-T	d/d'>.60	15.0000	11.0000	0.3750	71
					.33<d/d'<.60	12.0000	11.0000	0.3750	70
					d/d'<.33	17.0000	11.0000	0.3750	73
86	18	x 7 1/2	x	50.0 I-T	d/d'>.60	15.0000	11.0000	0.3750	71
					.33<d/d'<.60	12.0000	11.0000	0.3750	70
					d/d'<.33	17.0000	11.0000	0.3750	73
87	18	x 7 1/2	x	60.0 I-T	d/d'>.60	15.0000	11.0000	0.5000	81
					.33<d/d'<.60	12.0000	11.0000	0.5000	80
					d/d'<.33	17.0000	11.0000	0.5000	82
88	18	x 7 5/8	x	71.0 I-T	d/d'>.60	15.0000	11.5000	0.5000	84
					.33<d/d'<.60	12.0000	11.5000	0.5000	83
					d/d'<.33	17.0000	11.5000	0.5000	85
89	18	x 11 1/8	x	86.0 I-T	d/d'>.60	15.0000	11.5000	0.5000	84
					.33<d/d'<.60	12.0000	11.5000	0.5000	83
					d/d'<.33	17.0000	11.5000	0.5000	85
90	18	x 11 1/8	x	97.0 I-T	d/d'>.60	15.0000	11.5000	0.6250	96
					.33<d/d'<.60	12.0000	11.5000	0.6250	94
					d/d'<.33	17.0000	11.5000	0.6250	97

TABLE XI. Plate bracket - typical dimensions. - Continued

PIERCING MEMBER			DEPTH RATIO	DIMENSION A	DIMENSION B	PLATE THICKNESS	PLATE BRACKET ID
IN x IN x LBS/FT				IN	IN	IN	
91	18	x 11 1/4 x 106.0 I-T	d/d'>.60	15.0000	11.5000	0.6250	96
			.33<d/d'<.60	13.0000	11.5000	0.6250	95
			d/d'<.33	17.0000	11.5000	0.6250	97
92	18	x 11 1/4 x 119.0 I-T	d/d'>.60	16.0000	11.5000	0.7500	105
			.33<d/d'<.60	13.0000	11.5000	0.7500	104
			d/d'<.33	18.0000	11.5000	0.7500	106
93	21	x 8 1/4 x 62.0 I-T	d/d'>.60	17.0000	13.0000	0.5000	87
			.33<d/d'<.60	14.0000	13.0000	0.5000	86
			d/d'<.33	19.0000	13.0000	0.5000	89
94	21	x 8 1/4 x 68.0 I-T	d/d'>.60	17.0000	13.0000	0.5000	87
			.33<d/d'<.60	14.0000	13.0000	0.5000	86
			d/d'<.33	20.0000	13.0000	0.5000	90
95	21	x 8 1/4 x 73.0 I-T	d/d'>.60	17.0000	13.0000	0.5000	87
			.33<d/d'<.60	14.0000	13.0000	0.5000	86
			d/d'<.33	20.0000	13.0000	0.5000	90
96	21	x 8 3/8 x 83.0 I-T	d/d'>.60	18.0000	13.0000	0.6250	99
			.33<d/d'<.60	14.0000	13.0000	0.6250	98
			d/d'<.33	20.0000	13.0000	0.6250	100
97	21	x 8 3/8 x 93.0 I-T	d/d'>.60	18.0000	13.5000	0.6250	102
			.33<d/d'<.60	14.0000	13.5000	0.6250	101
			d/d'<.33	20.0000	13.5000	0.6250	103
98	21	x 12 1/4 x 101.0 I-T	d/d'>.60	18.0000	13.0000	0.5000	88
			.33<d/d'<.60	14.0000	13.0000	0.5000	86
			d/d'<.33	20.0000	13.0000	0.5000	90
99	21	x 12 3/8 x 111.0 I-T	d/d'>.60	18.0000	13.0000	0.6250	99
			.33<d/d'<.60	14.0000	13.0000	0.6250	98
			d/d'<.33	20.0000	13.0000	0.6250	100

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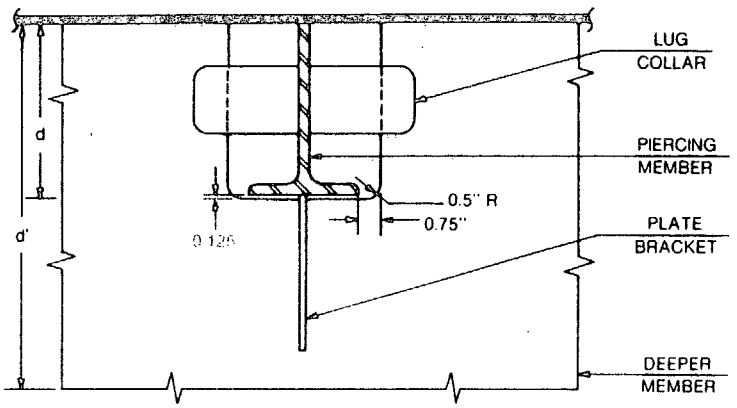
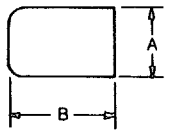
KEY DIAGRAM FOR LUG COLLAR





DETAIL FOR
LUG COLLAR

NOTE:
CUTOUT DIMENSIONS
SAME FOR LAPPED
AND FLUSH COLLAR

Algorithms for Lug Collar

A: If $\frac{d}{d'} > .6$ ____ $A = .5d$

If $\frac{d}{d'} \leq .6$ ____ $A = .4d$

B: If $5t_w > 2.0"$ ____ $B = .5(w_f - t_w) + 2.75"$

If $5t_w \leq 2.0"$ ____ $B = .5(w_f - t_w) + 5t_w + .75"$

T: $T = t_w$

NOTE:

1. d, w_f & t_w are dimensions of the piercing member
2. d' is the depth of the deeper member

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FIGURE 9. Key diagram and algorithms for lug collar.

TABLE XII. Lug collar - typical dimensions.

PIERCING MEMBER IN x IN x LBS/FT							DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	LUG COLLAR ID
1	4	x	4	x	5.0	T	d/d'>.60	2.0000	3.5000	0.2500	1
							d/d'<.60	2.0000	3.5000	0.2500	1
2	4	x	4	x	6.5	T	d/d'>.60	2.0000	4.0000	0.2500	4
							d/d'<.60	2.0000	4.0000	0.2500	4
3	4	x	4	x	7.5	T	d/d'>.60	3.0000	4.0000	0.2500	5
							d/d'<.60	2.0000	4.0000	0.2500	4
4	4	x	5 1/4	x	9.0	T	d/d'>.60	3.0000	4.5000	0.2500	11
							d/d'<.60	2.0000	4.5000	0.2500	10
5	4	x	4	x	13.0	I-T	d/d'>.60	3.0000	4.5000	0.3750	30
							d/d'<.60	2.0000	4.5000	0.3750	29
6	5	x	4	x	6.0	T	d/d'>.60	3.0000	4.0000	0.2500	5
							d/d'<.60	2.0000	4.0000	0.2500	4
7	5	x	4	x	7.5	T	d/d'>.60	3.0000	4.0000	0.2500	5
							d/d'<.60	2.0000	4.0000	0.2500	4
8	5	x	4	x	8.5	T	d/d'>.60	3.0000	4.0000	0.2500	5
							d/d'<.60	3.0000	4.0000	0.2500	5
9	5	x	4	x	9.5	T	d/d'>.60	3.0000	4.0000	0.2500	5
							d/d'<.60	3.0000	4.0000	0.2500	5
10	5	x	5	x	16.0	I-T	d/d'>.60	3.0000	4.5000	0.2500	11
							d/d'<.60	3.0000	4.5000	0.2500	11
11	5	x	5	x	19.0	I-T	d/d'>.60	3.0000	4.5000	0.3750	30
							d/d'<.60	3.0000	4.5000	0.3750	30
12	6	x	4	x	7.0	T	d/d'>.60	3.0000	4.0000	0.2500	5
							d/d'<.60	3.0000	4.0000	0.2500	5
13	6	x	4	x	7.0	T	d/d'>.60	3.0000	4.0000	0.2500	5
							d/d'<.60	3.0000	4.0000	0.2500	5

TABLE XII. Lug collar - typical dimensions. - Continued

PIERCING MEMBER IN x IN x LBS/FT					DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	LUG COLLAR ID
14	6	x 4	x 9.0	I-T	d/d'>.60	3.0000	3.5000	0.2500	2
					d/d'<.60	3.0000	3.5000	0.2500	2
15	6	x 4	x 9.5	T	d/d'>.60	4.0000	4.0000	0.2500	6
					d/d'<.60	3.0000	4.0000	0.2500	5
16	6	x 4	x 11.0	T	d/d'>.60	4.0000	4.0000	0.3750	26
					d/d'<.60	3.0000	4.0000	0.3750	25
17	6	x 4	x 12.0	I-T	d/d'>.60	4.0000	4.0000	0.2500	6
					d/d'<.60	3.0000	4.0000	0.2500	5
18	6	x 6	x 15.0	I-T	d/d'>.60	3.0000	5.0000	0.2500	16
					d/d'<.60	3.0000	5.0000	0.2500	16
19	6	x 4	x 16.0	I-T	d/d'>.60	4.0000	4.0000	0.3750	26
					d/d'<.60	3.0000	4.0000	0.3750	25
20	6	x 6	x 20.0	I-T	d/d'>.60	4.0000	5.0000	0.3750	35
					d/d'<.60	3.0000	5.0000	0.3750	34
21	7	x 5	x 11.0	T	d/d'>.60	4.0000	4.5000	0.2500	12
					d/d'<.60	3.0000	4.5000	0.2500	11
22	7	x 5	x 13.0	T	d/d'>.60	4.0000	4.5000	0.3750	31
					d/d'<.60	3.0000	4.5000	0.3750	30
23	7	x 6 3/4	x 15.0	T	d/d'>.60	4.0000	5.5000	0.3750	41
					d/d'<.60	3.0000	5.5000	0.3750	40
24	7	x 6 3/4	x 17.0	T	d/d'>.60	4.0000	5.5000	0.3750	41
					d/d'<.60	3.0000	5.5000	0.3750	40
25	7	x 6 3/4	x 19.0	T	d/d'>.60	4.0000	6.0000	0.3750	48
					d/d'<.60	3.0000	6.0000	0.3750	47
26	7	x 8	x 21.5	T	d/d'>.60	4.0000	6.5000	0.3750	55
					d/d'<.60	3.0000	6.5000	0.3750	54

TABLE XII. Lug collar - typical dimensions. - Continued

PIERCING MEMBER IN x IN x LBS/FT						DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	LUG COLLAR ID
27	7	x 8	x 24.0	T	d/d'>.60	4.0000	6.5000	0.3750	55
					d/d'<.60	3.0000	6.5000	0.3750	54
28	8	x 4	x 10.0	I-T	d/d'>.60	4.0000	3.5000	0.2500	3
					d/d'<.60	4.0000	3.5000	0.2500	3
29	8	x 4	x 13.0	I-T	d/d'>.60	4.0000	4.0000	0.2500	6
					d/d'<.60	4.0000	4.0000	0.2500	6
30	8	x 5 1/2	x 13.0	T	d/d'>.60	4.0000	5.0000	0.2500	17
					d/d'<.60	4.0000	5.0000	0.2500	17
31	8	x 4	x 15.0	I-T	d/d'>.60	5.0000	4.0000	0.2500	7
					d/d'<.60	4.0000	4.0000	0.2500	6
32	8	x 5 1/2	x 15.5	T	d/d'>.60	4.0000	5.0000	0.3750	35
					d/d'<.60	4.0000	5.0000	0.3750	35
33	8	x 5 1/4	x 18.0	I-T	d/d'>.60	5.0000	4.5000	0.2500	13
					d/d'<.60	4.0000	4.5000	0.2500	12
34	8	x 7	x 18.0	T	d/d'>.60	4.0000	6.0000	0.3750	48
					d/d'<.60	4.0000	6.0000	0.3750	48
35	8	x 7	x 20.0	T	d/d'>.60	5.0000	6.0000	0.3750	49
					d/d'<.60	4.0000	6.0000	0.3750	48
36	8	x 5 1/4	x 21.0	I-T	d/d'>.60	5.0000	5.0000	0.2500	18
					d/d'<.60	4.0000	5.0000	0.2500	17
37	8	x 7	x 22.5	T	d/d'>.60	5.0000	6.0000	0.3750	49
					d/d'<.60	4.0000	6.0000	0.3750	48
38	8	x 6 1/4	x 24.0	I-T	d/d'>.60	4.0000	5.5000	0.2500	22
					d/d'<.60	4.0000	5.5000	0.2500	22
39	8	x 7 1/8	x 25.0	T	d/d'>.60	5.0000	6.0000	0.5000	64
					d/d'<.60	4.0000	6.0000	0.5000	63

TABLE XII. Lug collar - typical dimensions. - Continued

		PIERCING MEMBER IN x IN x LBS/FT	DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	LUG COLLAR ID
40	8	x 6 1/2 x 28.0 I-T	d/d'>.60	5.0000	5.5000	0.3750	42
			d/d'<.60	4.0000	5.5000	0.3750	41
41	8	x 7 1/8 x 28.5 T	d/d'>.60	5.0000	6.5000	0.5000	68
			d/d'<.60	4.0000	6.5000	0.5000	67
42	8	x 8 x 31.0 I-T	d/d'>.60	4.0000	6.5000	0.3750	55
			d/d'<.60	4.0000	6.5000	0.3750	55
43	9	x 6 x 17.5 T	d/d'>.60	5.0000	5.5000	0.3750	42
			d/d'<.60	4.0000	5.5000	0.3750	41
44	9	x 6 x 20.0 T	d/d'>.60	5.0000	5.5000	0.3750	42
			d/d'<.60	4.0000	5.5000	0.3750	41
45	10	x 4 x 12.0 I-T	d/d'>.60	5.0000	4.0000	0.2500	7
			d/d'<.60	4.0000	4.0000	0.2500	6
46	10	x 4 x 15.0 I-T	d/d'>.60	5.0000	4.0000	0.2500	7
			d/d'<.60	4.0000	4.0000	0.2500	6
47	10	x 4 x 17.0 I-T	d/d'>.60	6.0000	4.0000	0.2500	8
			d/d'<.60	5.0000	4.0000	0.2500	7
48	10	x 4 x 19.0 I-T	d/d'>.60	6.0000	4.0000	0.2500	8
			d/d'<.60	5.0000	4.0000	0.2500	7
49	10	x 5 3/4 x 22.0 I-T	d/d'>.60	6.0000	5.0000	0.2500	19
			d/d'<.60	5.0000	5.0000	0.2500	18
50	10	x 5 3/4 x 26.0 I-T	d/d'>.60	6.0000	5.0000	0.3750	37
			d/d'<.60	5.0000	5.0000	0.3750	36
51	10	x 5 3/4 x 30.0 I-T	d/d'>.60	6.0000	5.5000	0.3750	43
			d/d'<.60	5.0000	5.5000	0.3750	42
52	10	x 8 x 33.0 I-T	d/d'>.60	5.0000	6.5000	0.3750	56
			d/d'<.60	4.0000	6.5000	0.3750	55

TABLE XII. Lug collar - typical dimensions. - Continued

PIERCING MEMBER IN x IN x LBS/FT					DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	LUG COLLAR ID
53	10	x 8	x	39.0 I-T	d/d'>.60	5.0000	6.5000	0.3750	56
					d/d'<.60	4.0000	6.5000	0.3750	55
54	10	x 8	x	45.0 I-T	d/d'>.60	6.0000	6.5000	0.3750	57
					d/d'<.60	5.0000	6.5000	0.3750	56
55	12	x 4	x	14.0 I-T	d/d'>.60	6.0000	4.0000	0.2500	8
					d/d'<.60	5.0000	4.0000	0.2500	7
56	12	x 4	x	16.0 I-T	d/d'>.60	6.0000	4.0000	0.2500	8
					d/d'<.60	5.0000	4.0000	0.2500	7
57	12	x 4	x	19.0 I-T	d/d'>.60	7.0000	4.0000	0.2500	9
					d/d'<.60	5.0000	4.0000	0.2500	7
58	12	x 4	x	22.0 I-T	d/d'>.60	7.0000	4.0000	0.3750	28
					d/d'<.60	5.0000	4.0000	0.3750	27
59	12	x 6 1/2	x	26.0 I-T	d/d'>.60	7.0000	5.5000	0.2500	24
					d/d'<.60	5.0000	5.5000	0.2500	23
60	12	x 6 1/2	x	30.0 I-T	d/d'>.60	7.0000	5.5000	0.3750	44
					d/d'<.60	5.0000	5.5000	0.3750	42
61	12	x 6 1/2	x	35.0 I-T	d/d'>.60	7.0000	5.5000	0.3750	44
					d/d'<.60	5.0000	5.5000	0.3750	42
62	12	x 8	x	40.0 I-T	d/d'>.60	6.0000	6.5000	0.3750	57
					d/d'<.60	5.0000	6.5000	0.3750	56
63	12	x 8	x	45.0 I-T	d/d'>.60	7.0000	6.5000	0.3750	58
					d/d'<.60	5.0000	6.5000	0.3750	56
64	12	x 8 1/8	x	50.0 I-T	d/d'>.60	7.0000	6.5000	0.3750	58
					d/d'<.60	5.0000	6.5000	0.3750	56
65	12	x 10	x	53.0 I-T	d/d'>.60	7.0000	7.5000	0.3750	62
					d/d'<.60	5.0000	7.5000	0.3750	61

TABLE XII. Lug collar - typical dimensions. - Continued

	PIERCING MEMBER IN x IN x LBS/FT	DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	LUG COLLAR ID
66 12	x 10 x 58.0 I-T	d/d'>.60	7.0000	7.5000	0.3750	62
		d/d'<.60	5.0000	7.5000	0.3750	61
67 14	x 5 x 22.0 I-T	d/d'>.60	7.0000	4.5000	0.2500	15
		d/d'<.60	6.0000	4.5000	0.2500	14
68 14	x 5 x 26.0 I-T	d/d'>.60	7.0000	4.5000	0.3750	33
		d/d'<.60	6.0000	4.5000	0.3750	32
69 14	x 6 3/4 x 30.0 I-T	d/d'>.60	7.0000	5.5000	0.3750	44
		d/d'<.60	6.0000	5.5000	0.3750	43
70 14	x 6 3/4 x 34.0 I-T	d/d'>.60	7.0000	5.5000	0.3750	44
		d/d'<.60	6.0000	5.5000	0.3750	43
71 14	x 6 3/4 x 38.0 I-T	d/d'>.60	8.0000	6.0000	0.3750	52
		d/d'<.60	6.0000	6.0000	0.3750	50
72 14	x 8 x 43.0 I-T	d/d'>.60	7.0000	6.5000	0.3750	58
		d/d'<.60	6.0000	6.5000	0.3750	57
73 14	x 8 x 48.0 I-T	d/d'>.60	7.0000	6.5000	0.3750	58
		d/d'<.60	6.0000	6.5000	0.3750	57
74 16	x 5 1/2 x 26.0 I-T	d/d'>.60	8.0000	5.0000	0.2500	21
		d/d'<.60	7.0000	5.0000	0.2500	20
75 16	x 5 1/2 x 31.0 I-T	d/d'>.60	8.0000	5.0000	0.3750	39
		d/d'<.60	7.0000	5.0000	0.3750	38
76 16	x 7 x 36.0 I-T	d/d'>.60	8.0000	6.0000	0.3750	52
		d/d'<.60	7.0000	6.0000	0.3750	51
77 16	x 7 x 40.0 I-T	d/d'>.60	9.0000	6.0000	0.3750	53
		d/d'<.60	7.0000	6.0000	0.3750	51
78 16	x 7 x 45.0 I-T	d/d'>.60	9.0000	6.0000	0.3750	53
		d/d'<.60	7.0000	6.0000	0.3750	51

TABLE XII. Lug collar - typical dimensions. - Continued

	PIERCING MEMBER	DEPTH RATIO	DIMENSION A	DIMENSION B	PLATE THICKNESS	LUG COLLAR
	IN x IN x LBS/FT		IN	IN	IN	ID
79 16	x 7 1/8 x 50.0 I-T	d/d'>.60	9.0000	6.0000	0.5000	66
		d/d'<.60	7.0000	6.0000	0.5000	65
80 16	x 7 1/8 x 57.0 I-T	d/d'>.60	9.0000	6.5000	0.5000	71
		d/d'<.60	7.0000	6.5000	0.5000	69
81 16	x 10 1/4 x 67.0 I-T	d/d'>.60	9.0000	8.0000	0.5000	76
		d/d'<.60	7.0000	8.0000	0.5000	75
82 16	x 10 1/4 x 77.0 I-T	d/d'>.60	9.0000	8.0000	0.5000	76
		d/d'<.60	7.0000	8.0000	0.5000	75
83 16	x 10 3/8 x 89.0 I-T	d/d'>.60	9.0000	8.0000	0.6250	84
		d/d'<.60	7.0000	8.0000	0.6250	83
84 18	x 6 x 35.0 I-T	d/d'>.60	9.0000	5.5000	0.3750	46
		d/d'<.60	8.0000	5.5000	0.3750	45
85 18	x 6 x 40.0 I-T	d/d'>.60	9.0000	5.5000	0.3750	46
		d/d'<.60	8.0000	5.5000	0.3750	45
86 18	x 7 1/2 x 50.0 I-T	d/d'>.60	9.0000	6.5000	0.3750	60
		d/d'<.60	8.0000	6.5000	0.3750	59
87 18	x 7 1/2 x 60.0 I-T	d/d'>.60	10.0000	6.5000	0.5000	72
		d/d'<.60	8.0000	6.5000	0.5000	70
88 18	x 7 5/8 x 71.0 I-T	d/d'>.60	10.0000	6.5000	0.5000	72
		d/d'<.60	8.0000	6.5000	0.5000	70
89 18	x 11 1/8 x 86.0 I-T	d/d'>.60	10.0000	8.5000	0.5000	78
		d/d'<.60	8.0000	8.5000	0.5000	77
90 18	x 11 1/8 x 97.0 I-T	d/d'>.60	10.0000	8.5000	0.6250	86
		d/d'<.60	8.0000	8.5000	0.6250	85
91 18	x 11 1/4 x 106.0 I-T	d/d'>.60	10.0000	8.5000	0.6250	86
		d/d'<.60	8.0000	8.5000	0.6250	85

TABLE XII. Lug collar - typical dimensions. - Continued

PIERCING MEMBER IN x IN x LBS/FT			DEPTH RATIO	DIMENSION A IN	DIMENSION B IN	PLATE THICKNESS IN	LUG COLLAR ID
92	18	x 11 1/4 x 119.0 I-T	d/d'>.60	10.0000	8.5000	0.7500	90
			d/d'<.60	8.0000	8.5000	0.7500	89
93	21	x 8 1/4 x 62.0 I-T	d/d'>.60	11.0000	7.0000	0.5000	74
			d/d'<.60	9.0000	7.0000	0.5000	73
94	21	x 8 1/4 x 68.0 I-T	d/d'>.60	11.0000	7.0000	0.5000	74
			d/d'<.60	9.0000	7.0000	0.5000	73
95	21	x 8 1/4 x 73.0 I-T	d/d'>.60	11.0000	7.0000	0.5000	74
			d/d'<.60	9.0000	7.0000	0.5000	73
96	21	x 8 3/8 x 83.0 I-T	d/d'>.60	11.0000	7.0000	0.6250	82
			d/d'<.60	9.0000	7.0000	0.6250	81
97	21	x 8 3/8 x 93.0 I-T	d/d'>.60	11.0000	7.0000	0.6250	82
			d/d'<.60	9.0000	7.0000	0.6250	81
98	21	x 12 1/4 x 101.0 I-T	d/d'>.60	11.0000	9.0000	0.5000	80
			d/d'<.60	9.0000	9.0000	0.5000	79
99	21	x 12 3/8 x 111.0 I-T	d/d'>.60	11.0000	9.0000	0.6250	88
			d/d'<.60	9.0000	9.0000	0.6250	87

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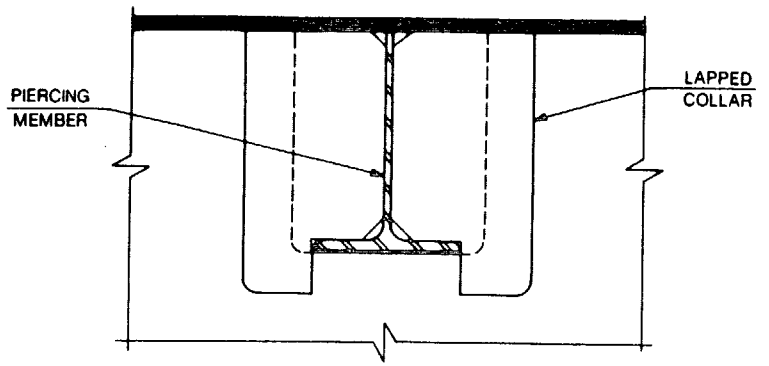
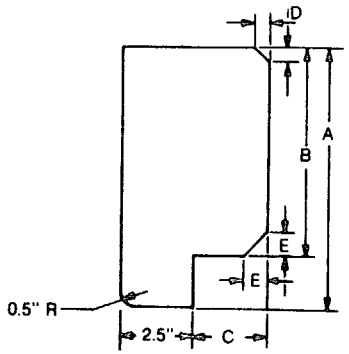
KEY DIAGRAM FOR LAPPED COLLAR





DETAIL
LAPPED COLLAR

SH 12965

Algorithms for Lapped Collar

A: $A = d + 1.5"$

* B: $B = d - t_f$

* C: $C = .5(w_f - t_w)$

D: If member is a 'T' _____ $D = t_w + .125"$

If member is an 'I-T' _____ $D = k + .125"$

If $D \leq .5"$ and
$C \geq 1.0"$ _____ $D = .5"$

E: $E = k - t_f + .125"$

If $E \leq .5"$ and
$C \geq 1.0"$ _____ $E = .5"$

T: $T = t_w$

NOTE:

1. d, t_f, w_f, k & t_w are dimensions of piercing member
2. * indicates a neat fit dimension
3. **Flush or lapped collars shall be provided at connections to the shell, aircraft landing decks, ballistic bulkheads and in way of blast loadings and concentrated loads.**
4. Radius of $\frac{C}{2}$ is acceptable

FIGURE 10. Key diagram and algorithms for lapped collar.

TABLE XIII. Lapped collar - typical dimensions.

	PIERCING MEMBER			DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION E	PLATE THICKNESS	LAPPED COLLAR
	IN x IN x LBS/FT			IN	IN	IN	IN	IN	IN	ID
1	4	x 4	x 5.0 T	6.0000	3.5000	1.7500	0.5000	3.7500	0.2500	1
2	4	x 4	x 6.5 T	6.0000	3.5000	1.7500	0.5000	3.7500	0.2500	1
3	4	x 4	x 7.5 T	6.0000	3.5000	1.7500	0.5000	3.7500	0.2500	1
4	4	x 5 1/4	x 9.0 T	6.0000	3.5000	2.2500	0.5000	3.7500	0.2500	14
5	4	x 4	x 13.0 I-T	6.0000	3.7500	1.7500	1.0000	4.0000	0.3750	25
6	5	x 4	x 6.0 T	7.0000	4.5000	1.7500	0.5000	4.7500	0.2500	2
7	5	x 4	x 7.5 T	7.0000	4.5000	1.7500	0.5000	4.7500	0.2500	2
8	5	x 4	x 8.5 T	7.0000	4.5000	1.7500	0.5000	4.7500	0.2500	2
9	5	x 4	x 9.5 T	7.0000	4.5000	1.7500	0.5000	4.7500	0.2500	2
10	5	x 5	x 16.0 I-T	7.0000	4.5000	2.2500	1.0000	4.7500	0.2500	15
11	5	x 5	x 19.0 I-T	7.0000	4.5000	2.2500	1.0000	4.7500	0.3750	29
12	6	x 4	x 7.0 T	8.0000	5.5000	1.7500	0.5000	5.7500	0.2500	3
13	6	x 4	x 7.0 T	8.0000	5.5000	1.7500	0.5000	5.7500	0.2500	3
14	6	x 4	x 9.0 I-T	8.0000	5.5000	1.7500	0.7500	5.7500	0.2500	4
15	6	x 4	x 9.5 T	8.0000	5.5000	1.7500	0.5000	5.7500	0.2500	3
16	6	x 4	x 11.0 T	8.0000	5.5000	1.7500	0.5000	5.7500	0.3750	26
17	6	x 4	x 12.0 I-T	8.0000	5.7500	1.7500	0.7500	5.7500	0.2500	5
18	6	x 6	x 15.0 I-T	8.0000	5.5000	2.7500	0.7500	5.7500	0.2500	22
19	6	x 4	x 16.0 I-T	8.0000	5.7500	1.7500	1.0000	6.0000	0.3750	27
20	6	x 6	x 20.0 I-T	8.0000	5.7500	2.7500	1.0000	6.0000	0.3750	38
21	7	x 5	x 11.0 T	9.0000	6.5000	2.2500	0.5000	6.7500	0.2500	16
22	7	x 5	x 13.0 T	9.0000	6.5000	2.2500	0.5000	6.7500	0.3750	30
23	7	x 6 3/4	x 15.0 T	9.0000	6.5000	3.0000	0.5000	6.7500	0.3750	41
24	7	x 6 3/4	x 17.0 T	9.0000	6.5000	3.0000	0.5000	6.7500	0.3750	41
25	7	x 6 3/4	x 19.0 T	9.0000	6.5000	3.0000	0.5000	6.7500	0.3750	41
26	7	x 8	x 21.5 T	9.0000	6.2500	3.5000	0.5000	6.5000	0.3750	51
27	7	x 8	x 24.0 T	9.0000	6.2500	3.5000	0.5000	6.5000	0.3750	51
28	8	x 4	x 10.0 I-T	10.0000	7.5000	1.7500	0.7500	7.7500	0.2500	6
29	8	x 4	x 13.0 I-T	10.0000	7.5000	1.7500	1.0000	7.7500	0.2500	7
30	8	x 5 1/2	x 13.0 T	10.0000	7.5000	2.5000	0.5000	7.7500	0.2500	19
31	8	x 4	x 15.0 I-T	10.0000	7.7500	1.7500	1.0000	8.0000	0.2500	8
32	8	x 5 1/2	x 15.5 T	10.0000	7.5000	2.5000	0.5000	7.5000	0.3750	32
33	8	x 5 1/4	x 18.0 I-T	10.0000	7.7500	2.2500	1.0000	8.0000	0.2500	17
34	8	x 7	x 18.0 T	10.0000	7.5000	3.2500	0.5000	7.5000	0.3750	48
35	8	x 7	x 20.0 T	10.0000	7.5000	3.0000	0.5000	7.7500	0.3750	42
36	8	x 5 1/4	x 21.0 I-T	10.0000	7.7500	2.2500	1.0000	8.0000	0.2500	17
37	8	x 7	x 22.5 T	10.0000	7.5000	3.0000	0.5000	7.7500	0.3750	42

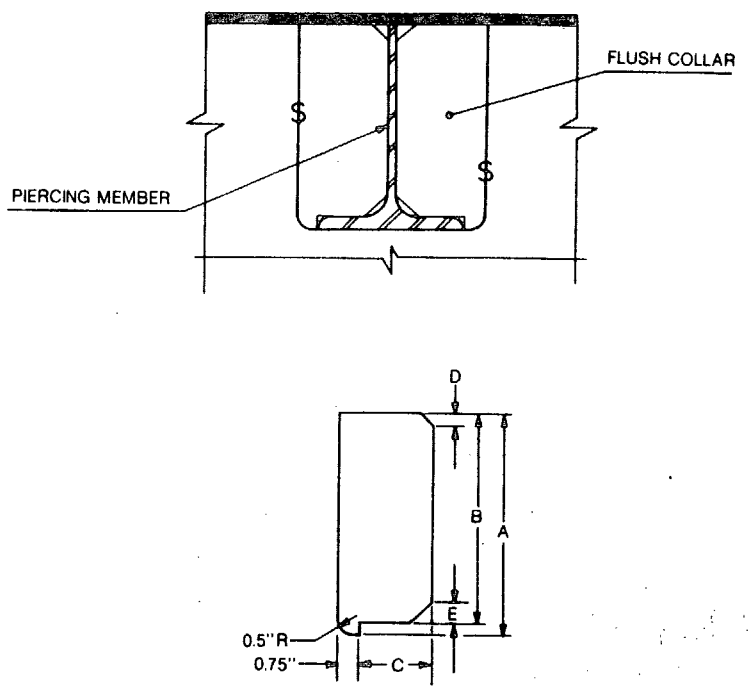
TABLE XIII. Lapped collar - typical dimensions. - Continued

		PIERCING MEMBER IN x IN x LBS/FT	DIMENSION A IN	DIMENSION B IN	DIMENSION C IN	DIMENSION D IN	DIMENSION E IN	PLATE THICKNESS IN	LAPPED COLLAR ID
38	8	x 6 1/4 x 24.0 I-T	10.0000	7.5000	3.0000	1.0000	7.7500	0.2500	23
39	8	x 7 1/8 x 25.0 T	10.0000	7.5000	3.0000	0.7500	7.5000	0.5000	61
40	8	x 6 1/2 x 28.0 I-T	10.0000	7.5000	3.0000	1.2500	7.7500	0.3750	43
41	8	x 7 1/8 x 28.5 T	10.0000	7.5000	3.0000	0.7500	7.7500	0.5000	62
42	8	x 8 x 31.0 I-T	10.0000	7.5000	3.7500	1.2500	7.7500	0.3750	57
43	9	x 6 x 17.5 T	11.0000	8.2500	2.7500	0.5000	8.5000	0.3750	39
44	9	x 6 x 20.0 T	11.0000	8.2500	2.5000	0.5000	8.5000	0.3750	33
45	10	x 4 x 12.0 I-T	12.0000	9.5000	1.7500	0.7500	9.7500	0.2500	9
46	10	x 4 x 15.0 I-T	12.0000	9.5000	1.7500	1.0000	9.7500	0.2500	10
47	10	x 4 x 17.0 I-T	12.0000	9.7500	1.7500	1.0000	10.0000	0.2500	11
48	10	x 4 x 19.0 I-T	12.0000	9.7500	1.7500	1.0000	10.0000	0.2500	11
49	10	x 5 3/4 x 22.0 I-T	12.0000	9.7500	2.5000	1.0000	10.0000	0.2500	20
50	10	x 5 3/4 x 26.0 I-T	12.0000	9.7500	2.5000	1.0000	10.0000	0.3750	34
51	10	x 5 3/4 x 30.0 I-T	12.0000	9.7500	2.5000	1.2500	10.0000	0.3750	35
52	10	x 8 x 33.0 I-T	12.0000	9.2500	3.7500	1.2500	9.5000	0.3750	58
53	10	x 8 x 39.0 I-T	12.0000	9.2500	3.5000	1.2500	9.5000	0.3750	52
54	10	x 8 x 45.0 I-T	12.0000	9.2500	3.5000	1.5000	9.5000	0.3750	53
55	12	x 4 x 14.0 I-T	14.0000	11.5000	1.7500	1.0000	11.7500	0.2500	12
56	12	x 4 x 16.0 I-T	14.0000	11.5000	1.7500	1.0000	11.7500	0.2500	12
57	12	x 4 x 19.0 I-T	14.0000	11.7500	1.7500	1.0000	12.0000	0.2500	13
58	12	x 4 x 22.0 I-T	14.0000	11.7500	1.7500	1.0000	12.0000	0.3750	28
59	12	x 6 1/2 x 26.0 I-T	14.0000	11.7500	3.0000	1.0000	12.0000	0.2500	24
60	12	x 6 1/2 x 30.0 I-T	14.0000	11.7500	3.0000	1.2500	12.0000	0.3750	44
61	12	x 6 1/2 x 35.0 I-T	14.0000	11.7500	3.0000	1.2500	12.0000	0.3750	44
62	12	x 8 x 40.0 I-T	14.0000	11.2500	3.5000	1.5000	11.5000	0.3750	54
63	12	x 8 x 45.0 I-T	14.0000	11.2500	3.5000	1.5000	11.5000	0.3750	54
64	12	x 8 1/8 x 50.0 I-T	14.0000	11.5000	3.5000	1.5000	11.7500	0.3750	55
65	12	x 10 x 53.0 I-T	14.0000	11.2500	4.5000	1.5000	11.5000	0.3750	59
66	12	x 10 x 58.0 I-T	14.0000	11.5000	4.5000	1.5000	11.7500	0.3750	60
67	14	x 5 x 22.0 I-T	16.0000	13.2500	2.2500	1.0000	13.5000	0.2500	18
68	14	x 5 x 26.0 I-T	16.0000	13.2500	2.2500	1.2500	13.5000	0.3750	31
69	14	x 6 3/4 x 30.0 I-T	16.0000	13.2500	3.0000	1.2500	13.5000	0.3750	45
70	14	x 6 3/4 x 34.0 I-T	16.0000	13.5000	3.0000	1.2500	13.7500	0.3750	46
71	14	x 6 3/4 x 38.0 I-T	16.0000	13.5000	3.0000	1.2500	13.7500	0.3750	46
72	14	x 8 x 43.0 I-T	16.0000	13.0000	3.5000	1.5000	13.2500	0.3750	56
73	14	x 8 x 48.0 I-T	16.0000	13.0000	3.5000	1.5000	13.2500	0.3750	56
74	16	x 5 1/2 x 26.0 I-T	18.0000	15.2500	2.5000	1.2500	15.5000	0.2500	21

TABLE XIII. Lapped collar - typical dimensions. - Continued

	PIERCING MEMBER			DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION E	PLATE THICKNESS	LAPPED COLLAR
	IN	x IN x LBS/FT		IN	IN	IN	IN	IN	IN	ID
75	16	x 5 1/2	x 31.0 I-T	18.0000	15.2500	2.5000	1.2500	15.5000	0.3750	36
76	16	x 7	x 36.0 I-T	18.0000	15.2500	3.2500	1.2500	15.5000	0.3750	49
77	16	x 7	x 40.0 I-T	18.0000	15.5000	3.0000	1.5000	15.7500	0.3750	47
78	16	x 7	x 45.0 I-T	18.0000	15.5000	3.0000	1.5000	15.7500	0.3750	47
79	16	x 7 1/8	x 50.0 I-T	18.0000	15.5000	3.0000	1.5000	15.7500	0.5000	63
80	16	x 7 1/8	x 57.0 I-T	18.0000	15.5000	3.0000	1.5000	15.7500	0.5000	63
81	16	x 10 1/4	x 67.0 I-T	18.0000	15.5000	4.7500	1.5000	15.7500	0.5000	69
82	16	x 10 1/4	x 77.0 I-T	19.0000	15.7500	4.7500	1.7500	16.0000	0.5000	70
83	16	x 10 3/8	x 89.0 I-T	19.0000	15.7500	4.5000	1.7500	16.0000	0.6250	75
84	18	x 6	x 35.0 I-T	20.0000	17.2500	2.7500	1.2500	17.5000	0.3750	40
85	18	x 6	x 40.0 I-T	20.0000	17.2500	2.5000	1.5000	17.5000	0.3750	37
86	18	x 7 1/2	x 50.0 I-T	20.0000	17.2500	3.2500	1.5000	17.5000	0.3750	50
87	18	x 7 1/2	x 60.0 I-T	20.0000	17.5000	3.2500	1.5000	17.7500	0.5000	64
88	18	x 7 5/8	x 71.0 I-T	20.0000	17.5000	3.2500	1.7500	17.7500	0.5000	65
89	18	x 11 1/8	x 86.0 I-T	20.0000	17.5000	5.0000	1.7500	17.7500	0.5000	71
90	18	x 11 1/8	x 97.0 I-T	21.0000	17.5000	5.0000	1.7500	17.7500	0.6250	76
91	18	x 11 1/4	x106.0 I-T	21.0000	17.7500	5.0000	1.7500	18.0000	0.6250	77
92	18	x 11 1/4	x119.0 I-T	21.0000	17.7500	5.0000	2.0000	18.0000	0.7500	79
93	21	x 8 1/4	x 62.0 I-T	23.0000	20.2500	3.7500	1.5000	20.5000	0.5000	66
94	21	x 8 1/4	x 68.0 I-T	23.0000	20.2500	3.7500	1.7500	20.5000	0.5000	67
95	21	x 8 1/4	x 73.0 I-T	23.0000	20.5000	3.7500	1.7500	20.5000	0.5000	68
96	21	x 8 3/8	x 83.0 I-T	23.0000	20.5000	3.7500	1.7500	20.7500	0.6250	74
97	21	x 8 3/8	x 93.0 I-T	24.0000	20.5000	3.5000	2.0000	20.7500	0.6250	73
98	21	x 12 1/4	x101.0 I-T	23.0000	20.5000	5.5000	1.7500	20.7500	0.5000	72
99	21	x 12 3/8	x111.0 I-T	24.0000	20.5000	5.5000	1.7500	20.7500	0.6250	78

KEY DIAGRAM FOR FLUSH COLLAR



DETAIL
FLUSH COLLAR

SH 12966

Algorithms for Flush Collar

❄ A: $A = d + .125"$

❄ B: $B = d - t_f$

❄ C: $C = .5(w_f - t_w)$

D: If member is a 'T' ____ $D = t_w + .125"$

If member is an 'I-T' ____ $D = k + .125"$

If $D \leq .5"$ and

$C \geq 1.0"$ ____ $D = .5"$

E: $E = k - t_f + .125"$

If $E \leq .5"$ and

$C \geq 1.0"$ ____ $E = .5"$

T: $T = t_w$

If $T < .1875"$ ____ $T = .1875"$

NOTE:

1. d, t_f, w_f, k, & t_w are dimensions of piercing member
2. If collar is tight the .125 term can be removed from the equations for D and E to produce a neat fit
3. ❄ indicates a neat fit dimension
4. **See Note 3 on Figure 10.**
5. **Radius of $\frac{C}{2}$ is acceptable.**

FIGURE 11. Key diagram and algorithms for flush collar.

TABLE XIV. Flush collar - typical dimensions.

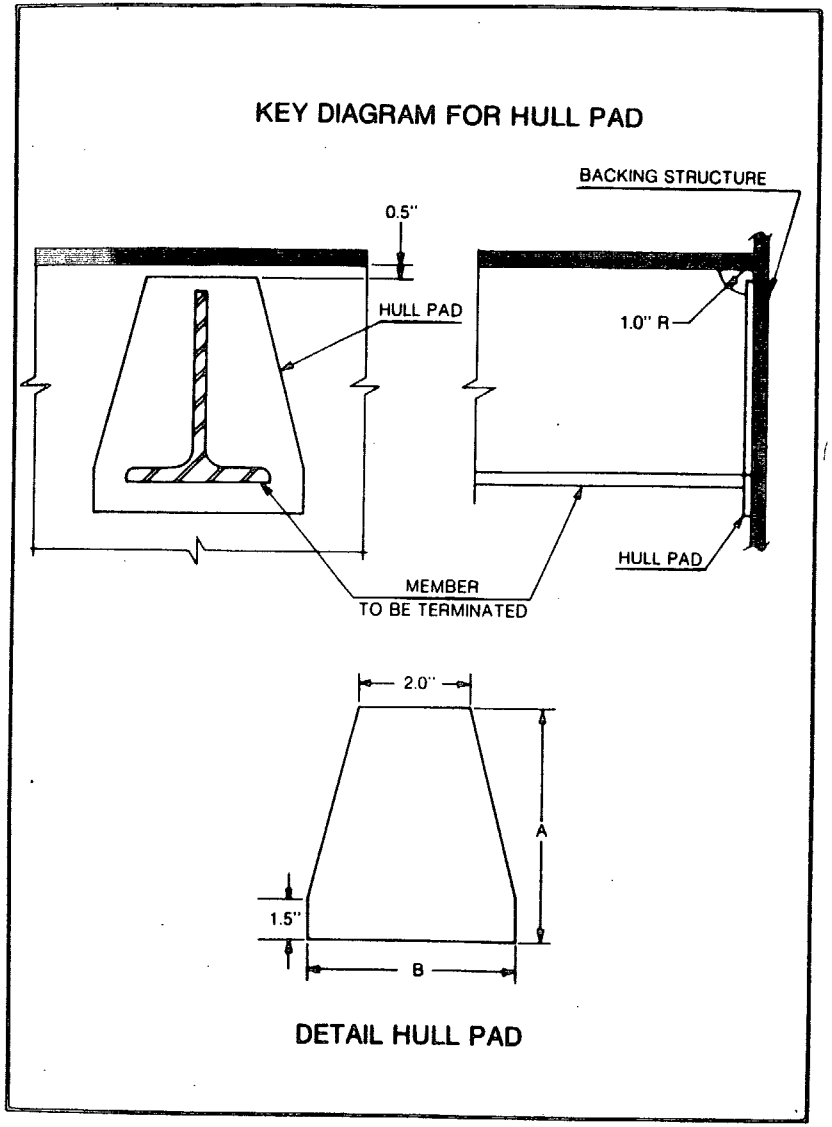
	PIERCING MEMBER			DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION E	PLATE THICKNESS	FLUSH COLLAR
	IN	IN	LBS/FT	IN	IN	IN	IN	IN	IN	ID
1	4	x 4	x 5.0 T	4.0000	3.5000	1.7500	0.5000	0.7500	0.2500	1
2	4	x 4	x 6.5 T	4.0000	3.5000	1.7500	0.5000	0.7500	0.2500	1
3	4	x 4	x 7.5 T	4.0000	3.5000	1.7500	0.5000	0.7500	0.2500	1
4	4	x 5 1/4	x 9.0 T	4.0000	3.5000	2.5000	0.5000	0.7500	0.2500	18
5	4	x 4	x 13.0 I-T	4.2500	3.7500	1.7500	1.0000	0.5000	0.3750	26
6	5	x 4	x 6.0 T	5.0000	4.5000	1.7500	0.5000	0.7500	0.2500	2
7	5	x 4	x 7.5 T	5.0000	4.5000	1.7500	0.5000	0.7500	0.2500	2
8	5	x 4	x 8.5 T	5.0000	4.5000	1.7500	0.5000	0.7500	0.2500	2
9	5	x 4	x 9.5 T	5.0000	4.5000	1.7500	0.5000	0.7500	0.2500	2
10	5	x 5	x 16.0 I-T	5.0000	4.5000	2.2500	1.0000	0.7500	0.2500	15
11	5	x 5	x 19.0 I-T	5.2500	4.5000	2.2500	1.0000	0.7500	0.3750	30
12	6	x 4	x 7.0 T	6.0000	5.5000	1.7500	0.5000	0.7500	0.2500	3
13	6	x 4	x 7.0 T	6.0000	5.5000	1.7500	0.5000	0.7500	0.2500	3
14	6	x 4	x 9.0 I-T	6.0000	5.5000	1.7500	0.7500	0.5000	0.2500	4
15	6	x 4	x 9.5 T	6.0000	5.5000	1.7500	0.5000	0.7500	0.2500	3
16	6	x 4	x 11.0 T	6.2500	5.5000	1.7500	0.5000	0.7500	0.3750	27
17	6	x 4	x 12.0 I-T	6.0000	5.7500	1.7500	0.7500	0.5000	0.2500	5
18	6	x 6	x 15.0 I-T	6.0000	5.5000	2.7500	0.7500	0.5000	0.2500	22
19	6	x 4	x 16.0 I-T	6.2500	5.7500	1.7500	1.0000	0.5000	0.3750	28
20	6	x 6	x 20.0 I-T	6.2500	5.7500	2.7500	1.0000	0.7500	0.3750	35
21	7	x 5	x 11.0 T	6.7500	6.5000	2.2500	0.5000	0.7500	0.2500	16
22	7	x 5	x 13.0 T	7.0000	6.5000	2.2500	0.5000	0.7500	0.3750	31
23	7	x 6 3/4	x 15.0 T	7.0000	6.5000	3.0000	0.5000	0.7500	0.3750	42
24	7	x 6 3/4	x 17.0 T	7.0000	6.5000	3.0000	0.5000	0.7500	0.3750	42
25	7	x 6 3/4	x 19.0 T	7.0000	6.5000	3.0000	0.5000	0.7500	0.3750	42
26	7	x 8	x 21.5 T	6.7500	6.2500	3.7500	0.5000	1.0000	0.3750	53
27	7	x 8	x 24.0 T	7.0000	6.2500	3.7500	0.5000	1.0000	0.3750	54
28	8	x 4	x 10.0 I-T	8.0000	7.5000	1.7500	0.7500	0.7500	0.2500	6
29	8	x 4	x 13.0 I-T	8.0000	7.5000	1.7500	1.0000	0.7500	0.2500	7
30	8	x 5 1/2	x 13.0 T	7.7500	7.5000	2.5000	0.5000	1.0000	0.2500	19
31	8	x 4	x 15.0 I-T	8.0000	7.7500	1.7500	1.0000	0.7500	0.2500	8
32	8	x 5 1/2	x 15.5 T	8.0000	7.5000	2.5000	0.5000	1.0000	0.3750	33
33	8	x 5 1/4	x 18.0 I-T	8.2500	7.7500	2.5000	1.0000	0.7500	0.2500	20
34	8	x 7	x 18.0 T	8.0000	7.5000	3.2500	0.5000	1.0000	0.3750	48
35	8	x 7	x 20.0 T	8.0000	7.5000	3.2500	0.5000	1.0000	0.3750	48
36	8	x 5 1/4	x 21.0 I-T	8.2500	7.7500	2.5000	1.0000	0.7500	0.2500	20
37	8	x 7	x 22.5 T	8.0000	7.5000	3.2500	0.5000	1.0000	0.3750	48

TABLE XIV. Flush collar - typical dimensions. - Continued

PIERCING MEMBER						DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION E	PLATE THICKNESS	FLUSH COLLAR
IN	x	IN	x	LBS/FT		IN	IN	IN	IN	IN	IN	ID
38	8	x	6 1/4	x 24.0	I-T	8.0000	7.5000	3.0000	1.0000	0.7500	0.2500	24
39	8	x	7 1/8	x 25.0	T	8.2500	7.5000	3.2500	0.7500	1.0000	0.5000	65
40	8	x	6 1/2	x 28.0	I-T	8.0000	7.5000	3.0000	1.2500	0.7500	0.3750	43
41	8	x	7 1/8	x 28.5	T	8.2500	7.5000	3.2500	0.7500	0.5000	0.5000	64
42	8	x	8	x 31.0	I-T	8.0000	7.5000	3.7500	1.2500	0.7500	0.3750	55
43	9	x	6	x 17.5	T	8.7500	8.2500	2.7500	0.5000	1.0000	0.3750	36
44	9	x	6	x 20.0	T	9.0000	8.2500	2.7500	0.5000	1.0000	0.3750	37
45	10	x	4	x 12.0	I-T	9.7500	9.5000	1.7500	0.7500	0.7500	0.2500	9
46	10	x	4	x 15.0	I-T	10.0000	9.5000	1.7500	1.0000	0.7500	0.2500	10
47	10	x	4	x 17.0	I-T	10.0000	9.7500	1.7500	1.0000	0.7500	0.2500	11
48	10	x	4	x 19.0	I-T	10.2500	9.7500	1.7500	1.0000	0.7500	0.2500	12
49	10	x	5 3/4	x 22.0	I-T	10.2500	9.7500	2.7500	1.0000	0.7500	0.2500	23
50	10	x	5 3/4	x 26.0	I-T	10.2500	9.7500	2.7500	1.0000	0.7500	0.3750	38
51	10	x	5 3/4	x 30.0	I-T	10.5000	9.7500	2.7500	1.2500	0.7500	0.3750	39
52	10	x	8	x 33.0	I-T	9.7500	9.2500	3.7500	1.2500	1.0000	0.3750	56
53	10	x	8	x 39.0	I-T	10.0000	9.2500	3.7500	1.2500	0.7500	0.3750	57
54	10	x	8	x 45.0	I-T	10.0000	9.2500	3.7500	1.5000	1.0000	0.3750	58
55	12	x	4	x 14.0	I-T	12.0000	11.5000	1.7500	1.0000	0.7500	0.2500	13
56	12	x	4	x 16.0	I-T	12.0000	11.5000	1.7500	1.0000	0.7500	0.2500	13
57	12	x	4	x 19.0	I-T	12.2500	11.7500	1.7500	1.0000	0.7500	0.2500	14
58	12	x	4	x 22.0	I-T	12.2500	11.7500	1.7500	1.0000	0.7500	0.3750	29
59	12	x	6 1/2	x 26.0	I-T	12.2500	11.7500	3.0000	1.0000	0.7500	0.2500	25
60	12	x	6 1/2	x 30.0	I-T	12.2500	11.7500	3.0000	1.2500	0.7500	0.3750	44
61	12	x	6 1/2	x 35.0	I-T	12.5000	11.7500	3.0000	1.2500	0.7500	0.3750	45
62	12	x	8	x 40.0	I-T	12.0000	11.2500	3.7500	1.5000	1.0000	0.3750	59
63	12	x	8	x 45.0	I-T	12.0000	11.2500	3.7500	1.5000	1.0000	0.3750	59
64	12	x	8 1/8	x 50.0	I-T	12.2500	11.5000	3.7500	1.5000	1.0000	0.3750	60
65	12	x	10	x 53.0	I-T	12.0000	11.2500	4.7500	1.5000	1.0000	0.3750	62
66	12	x	10	x 58.0	I-T	12.2500	11.5000	4.7500	1.5000	1.0000	0.3750	63
67	14	x	5	x 22.0	I-T	13.7500	13.2500	2.2500	1.0000	0.7500	0.2500	17
68	14	x	5	x 26.0	I-T	14.0000	13.2500	2.2500	1.2500	0.7500	0.3750	32
69	14	x	6 3/4	x 30.0	I-T	13.7500	13.2500	3.0000	1.2500	0.7500	0.3750	46
70	14	x	6 3/4	x 34.0	I-T	14.0000	13.5000	3.0000	1.2500	0.7500	0.3750	47
71	14	x	6 3/4	x 38.0	I-T	14.0000	13.5000	3.0000	1.2500	0.7500	0.3750	47
72	14	x	8	x 43.0	I-T	13.7500	13.0000	3.7500	1.5000	1.0000	0.3750	61
73	14	x	8	x 48.0	I-T	13.7500	13.0000	3.7500	1.5000	1.0000	0.3750	61
74	16	x	5 1/2	x 26.0	I-T	15.7500	15.2500	2.5000	1.2500	1.0000	0.2500	21

TABLE XIV. Flush collar - typical dimensions. - Continued

	PIERCING MEMBER			DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	DIMENSION E	PLATE THICKNESS	FLUSH COLLAR
	IN x IN x LBS/FT			IN	IN	IN	IN	IN	IN	ID
75	16	x 5 1/2	x 31.0 I-T	16.0000	15.2500	2.5000	1.2500	1.0000	0.3750	34
76	16	x 7	x 36.0 I-T	15.7500	15.2500	3.2500	1.2500	1.0000	0.3750	49
77	16	x 7	x 40.0 I-T	16.0000	15.5000	3.2500	1.5000	1.0000	0.3750	50
78	16	x 7	x 45.0 I-T	16.2500	15.5000	3.2500	1.5000	1.0000	0.3750	51
79	16	x 7 1/8	x 50.0 I-T	16.2500	15.5000	3.2500	1.5000	1.0000	0.5000	66
80	16	x 7 1/8	x 57.0 I-T	16.5000	15.5000	3.2500	1.5000	1.0000	0.5000	67
81	16	x 10 1/4	x 67.0 I-T	16.2500	15.5000	4.7500	1.5000	1.0000	0.5000	73
82	16	x 10 1/4	x 77.0 I-T	16.5000	15.7500	4.7500	1.7500	1.0000	0.5000	74
83	16	x 10 3/8	x 89.0 I-T	16.7500	15.7500	4.7500	1.7500	1.0000	0.6250	79
84	18	x 6	x 35.0 I-T	17.7500	17.2500	2.7500	1.2500	1.0000	0.3750	40
85	18	x 6	x 40.0 I-T	18.0000	17.2500	2.7500	1.5000	1.0000	0.3750	41
86	18	x 7 1/2	x 50.0 I-T	18.0000	17.2500	3.5000	1.5000	1.0000	0.3750	52
87	18	x 7 1/2	x 60.0 I-T	18.2500	17.5000	3.5000	1.5000	1.0000	0.5000	68
88	18	x 7 5/8	x 71.0 I-T	18.5000	17.5000	3.5000	1.7500	1.0000	0.5000	69
89	18	x 11 1/8	x 86.0 I-T	18.5000	17.5000	5.2500	1.7500	1.0000	0.5000	75
90	18	x 11 1/8	x 97.0 I-T	18.5000	17.5000	5.2500	1.7500	1.0000	0.6250	80
91	18	x 11 1/4	x106.0 I-T	18.7500	17.7500	5.2500	1.7500	1.0000	0.6250	81
92	18	x 11 1/4	x119.0 I-T	19.0000	17.7500	5.2500	2.0000	1.0000	0.7500	83
93	21	x 8 1/4	x 62.0 I-T	21.0000	20.2500	3.7500	1.5000	1.0000	0.5000	70
94	21	x 8 1/4	x 68.0 I-T	21.2500	20.2500	3.7500	1.7500	1.0000	0.5000	71
95	21	x 8 1/4	x 73.0 I-T	21.2500	20.5000	3.7500	1.7500	1.0000	0.5000	72
96	21	x 8 3/8	x 83.0 I-T	21.5000	20.5000	3.7500	1.7500	1.0000	0.6250	77
97	21	x 8 3/8	x 93.0 I-T	21.5000	20.5000	3.7500	2.0000	1.0000	0.6250	78
98	21	x 12 1/4	x101.0 I-T	21.2500	20.5000	5.7500	1.7500	1.0000	0.5000	76
99	21	x 12 3/8	x111.0 I-T	21.5000	20.5000	5.7500	1.7500	1.0000	0.6250	82



Algorithms for Hull Pad

A: $A = d + .5"$

B: $B = w_f + 2"$

T:

If	$d \leq 6"$	$T = .75" - t_b$
If	$6" < d \leq 8"$	$T = .875" - t_b$
If	$8" < d \leq 12"$	$T = 1.0" - t_b$
If	$d > 12"$	$T = 1.125" - t_b$
If	$0" < T < .1875"$	$T = .1875"$
If	$T \leq 0"$	$T = 0"$

NOTE:

1. d & w_f are dimensions of member to be terminated
2. t_b = thickness of backing structure
3. **Radius of $\frac{C}{2}$ is acceptable.**

FIGURE 12. Key diagram and algorithms for hull pad.

TABLE XV. Standard hull pad index.

	MEMBER TO BE TERMINATED IN x IN x LBS/FT							THICKNESS OF BACKING STRUCTURE (16ths in.)												
								3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	4	x	4		x	5.0	T	105	53	53	53	53	1	1	1	1	0	0	0	0	0
2	4	x	4		x	6.5	T	105	53	53	53	53	1	1	1	1	0	0	0	0	0
3	4	x	4		x	7.5	T	106	54	54	54	54	2	2	2	2	0	0	0	0	0
4	4	x	5	1/4	x	9.0	T	107	55	55	55	55	3	3	3	3	0	0	0	0	0
5	4	x	4		x	13.0	I-T	106	54	54	54	54	2	2	2	2	0	0	0	0	0
6	5	x	4		x	6.0	T	108	56	56	56	56	4	4	4	4	0	0	0	0	0
7	5	x	4		x	7.5	T	108	56	56	56	56	4	4	4	4	0	0	0	0	0
8	5	x	4		x	8.5	T	109	57	57	57	57	5	5	5	5	0	0	0	0	0
9	5	x	4		x	9.5	T	109	57	57	57	57	5	5	5	5	0	0	0	0	0
10	5	x	5		x	16.0	I-T	109	57	57	57	57	5	5	5	5	0	0	0	0	0
11	5	x	5		x	19.0	I-T	110	58	58	58	58	6	6	6	6	0	0	0	0	0
12	6	x	4		x	7.0	T	111	59	59	59	59	7	7	7	7	0	0	0	0	0
13	6	x	4		x	7.0	T	111	59	59	59	59	7	7	7	7	0	0	0	0	0
14.	6	x	4		x	9.0	I-T	111	59	59	59	59	7	7	7	7	0	0	0	0	0
15	6	x	4		x	9.5	T	112	60	60	60	60	8	8	8	8	0	0	0	0	0
16	6	x	4		x	11.0	T	112	60	60	60	60	8	8	8	8	0	0	0	0	0
17	6	x	4		x	12.0	I-T	111	59	59	59	59	7	7	7	7	0	0	0	0	0
18	6	x	6		x	15.0	I-T	113	61	61	61	61	9	9	9	9	0	0	0	0	0
19	6	x	4		x	16.0	I-T	112	60	60	60	60	8	8	8	8	0	0	0	0	0
20	6	x	6		x	20.0	I-T	114	62	62	62	62	10	10	10	10	0	0	0	0	0
21	7	x	5		x	11.0	T	115	115	115	63	63	63	63	11	11	11	11	0	0	0
22	7	x	5		x	13.0	T	116	116	116	64	64	64	64	12	12	12	12	0	0	0
23	7	x	6	3/4	x	15.0	T	117	117	117	65	65	65	65	13	13	13	13	0	0	0
24	7	x	6	3/4	x	17.0	T	117	117	117	65	65	65	65	13	13	13	13	0	0	0
25	7	x	6	3/4	x	19.0	T	117	117	117	65	65	65	65	13	13	13	13	0	0	0
26	7	x	8		x	21.5	T	118	118	118	66	66	66	66	14	14	14	14	0	0	0
27	7	x	8		x	24.0	T	119	119	119	67	67	67	67	15	15	15	15	0	0	0
28	8	x	4		x	10.0	I-T	120	120	120	68	68	68	68	16	16	16	16	0	0	0
29	8	x	4		x	13.0	I-T	120	120	120	68	68	68	68	16	16	16	16	0	0	0
30	8	x	5	1/2	x	13.0	T	122	122	122	70	70	70	70	18	18	18	18	0	0	0
31	8	x	4		x	15.0	I-T	121	121	121	69	69	69	69	17	17	17	17	0	0	0
32	8	x	5	1/2	x	15.5	T	122	122	122	70	70	70	70	18	18	18	18	0	0	0
33	8	x	5	1/4	x	18.0	I-T	122	122	122	70	70	70	70	18	18	18	18	0	0	0
34	8	x	7		x	18.0	T	123	123	123	71	71	71	71	19	19	19	19	0	0	0
35	8	x	7		x	20.0	T	123	123	123	71	71	71	71	19	19	19	19	0	0	0
36	8	x	5	1/4	x	21.0	I-T	122	122	122	70	70	70	70	18	18	18	18	0	0	0
37	8	x	7		x	22.5	T	124	124	124	72	72	72	72	20	20	20	20	0	0	0

TABLE XV. Standard hull pad index. - Continued

	MEMBER TO BE TERMINATED IN x IN x LBS/FT						THICKNESS OF BACKING STRUCTURE (16ths in.)												
							3	4	5	6	7	8	9	10	11	12	13	14	15	16
38	8	x	6 1/4	x	24.0	I-T	123	123	123	71	71	71	71	19	19	19	19	0	0	0
39	8	x	7 1/8	x	25.0	T	124	124	124	72	72	72	72	20	20	20	20	0	0	0
40	8	x	6 1/2	x	28.0	I-T	123	123	123	71	71	71	71	19	19	19	19	0	0	0
41	8	x	7 1/8	x	28.5	T	124	124	124	72	72	72	72	20	20	20	20	0	0	0
42	8	x	8	x	31.0	I-T	124	124	124	72	72	72	72	20	20	20	20	0	0	0
43	9	x	6	x	17.5	T	157	125	125	125	125	73	73	73	73	21	21	21	21	0
44	9	x	6	x	20.0	T	158	126	126	126	126	74	74	74	74	22	22	22	22	0
45	10	x	4	x	12.0	I-T	159	127	127	127	127	75	75	75	75	23	23	23	23	0
46	10	x	4	x	15.0	I-T	159	127	127	127	127	75	75	75	75	23	23	23	23	0
47	10	x	4	x	17.0	I-T	160	128	128	128	128	76	76	76	76	24	24	24	24	0
48	10	x	4	x	19.0	I-T	160	128	128	128	128	76	76	76	76	24	24	24	24	0
49	10	x	5 3/4	x	22.0	I-T	161	129	129	129	129	77	77	77	77	25	25	25	25	0
50	10	x	5 3/4	x	26.0	I-T	161	129	129	129	129	77	77	77	77	25	25	25	25	0
51	10	x	5 3/4	x	30.0	I-T	161	129	129	129	129	77	77	77	77	25	25	25	25	0
52	10	x	8	x	33.0	I-T	162	130	130	130	130	78	78	78	78	26	26	26	26	0
53	10	x	8	x	39.0	I-T	162	130	130	130	130	78	78	78	78	26	26	26	26	0
54	10	x	8	x	45.0	I-T	163	131	131	131	131	79	79	79	79	27	27	27	27	0
55	12	x	4	x	14.0	I-T	164	132	132	132	132	80	80	80	80	28	28	28	28	0
56	12	x	4	x	16.0	I-T	164	132	132	132	132	80	80	80	80	28	28	28	28	0
57	12	x	4	x	19.0	I-T	165	133	133	133	133	81	81	81	81	29	29	29	29	0
58	12	x	4	x	22.0	I-T	165	133	133	133	133	81	81	81	81	29	29	29	29	0
59	12	x	6 1/2	x	26.0	I-T	166	134	134	134	134	82	82	82	82	30	30	30	30	0
60	12	x	6 1/2	x	30.0	I-T	166	134	134	134	134	82	82	82	82	30	30	30	30	0
61	12	x	6 1/2	x	35.0	I-T	166	166	166	134	134	134	134	82	82	82	82	30	30	30
62	12	x	8	x	40.0	I-T	167	135	135	135	135	83	83	83	83	31	31	31	31	0
63	12	x	8	x	45.0	I-T	167	135	135	135	135	83	83	83	83	31	31	31	31	0
64	12	x	8 1/8	x	50.0	I-T	167	135	135	135	135	83	83	83	83	31	31	31	31	0
65	12	x	10	x	53.0	I-T	168	136	136	136	136	84	84	84	84	32	32	32	32	0
66	12	x	10	x	58.0	I-T	169	137	137	137	137	85	85	85	85	33	33	33	33	0
67	14	x	5	x	22.0	I-T	170	170	170	138	138	138	138	86	86	86	86	34	34	34
68	14	x	5	x	26.0	I-T	171	171	171	139	139	139	139	87	87	87	87	35	35	35
69	14	x	6 3/4	x	30.0	I-T	172	172	172	140	140	140	140	88	88	88	88	36	36	36
70	14	x	6 3/4	x	34.0	I-T	172	172	172	140	140	140	140	88	88	88	88	36	36	36
71	14	x	6 3/4	x	38.0	I-T	172	172	172	140	140	140	140	88	88	88	88	36	36	36
72	14	x	8	x	43.0	I-T	173	173	173	141	141	141	141	89	89	89	89	37	37	37
73	14	x	8	x	48.0	I-T	174	174	174	142	142	142	142	90	90	90	90	38	38	38
74	16	x	5 1/2	x	26.0	I-T	175	175	175	143	143	143	143	91	91	91	91	39	39	39

TABLE XV. Standard hull pad index. - Continued

MEMBER TO BE TERMINATED IN x IN x LBS/FT						THICKNESS OF BACKING STRUCTURE (16ths in.)												
						3	4	5	6	7	8	9	10	11	12	13	14	15	16
75	16	x 5 1/2	x	31.0	I-T	175	175	175	143	143	143	143	91	91	91	91	39	39	39
76	16	x 7	x	36.0	I-T	176	176	176	144	144	144	144	92	92	92	92	40	40	40
77	16	x 7	x	40.0	I-T	176	176	176	144	144	144	144	92	92	92	92	40	40	40
78	16	x 7	x	45.0	I-T	177	177	177	145	145	145	145	93	93	93	93	41	41	41
79	16	x 7 1/8	x	50.0	I-T	177	177	177	145	145	145	145	93	93	93	93	41	41	41
80	16	x 7 1/8	x	57.0	I-T	177	177	177	145	145	145	145	93	93	93	93	41	41	41
81	16	x 10 1/4	x	67.0	I-T	178	178	178	146	146	146	146	94	94	94	94	42	42	42
82	16	x 10 1/4	x	77.0	I-T	179	179	179	147	147	147	147	95	95	95	95	43	43	43
83	16	x 10 3/8	x	89.0	I-T	179	179	179	147	147	147	147	95	95	95	95	43	43	43
84	18	x 6	x	35.0	I-T	180	180	180	148	148	148	148	96	96	96	96	44	44	44
85	18	x 6	x	40.0	I-T	181	181	181	149	149	149	149	97	97	97	97	45	45	45
86	18	x 7 1/2	x	50.0	I-T	182	182	182	150	150	150	150	98	98	98	98	46	46	46
87	18	x 7 1/2	x	60.0	I-T	182	182	182	150	150	150	150	98	98	98	98	46	46	46
88	18	x 7 5/8	x	71.0	I-T	182	182	182	150	150	150	150	98	98	98	98	46	46	46
89	18	x 11 1/8	x	86.0	I-T	183	183	183	151	151	151	151	99	99	99	99	47	47	47
90	18	x 11 1/8	x	97.0	I-T	184	184	184	152	152	152	152	100	100	100	100	48	48	48
91	18	x 11 1/4	x	106.0	I-T	184	184	184	152	152	152	152	100	100	100	100	48	48	48
92	18	x 11 1/4	x	119.0	I-T	184	184	184	152	152	152	152	100	100	100	100	48	48	48
93	21	x 8 1/4	x	62.0	I-T	185	185	185	153	153	153	153	101	101	101	101	49	49	49
94	21	x 8 1/4	x	68.0	I-T	185	185	185	153	153	153	153	101	101	101	101	49	49	49
95	21	x 8 1/4	x	73.0	I-T	185	185	185	153	153	153	153	101	101	101	101	49	49	49
96	21	x 8 3/8	x	83.0	I-T	185	185	185	153	153	153	153	101	101	101	101	49	49	49
97	21	x 8 3/8	x	93.0	I-T	187	187	187	155	155	155	155	103	103	103	103	51	51	51
98	21	x 12 1/4	x	101.0	I-T	186	186	186	154	154	154	154	102	102	102	102	50	50	50
99	21	x 12 3/8	x	111.0	I-T	188	188	188	156	156	156	156	104	104	104	104	52	52	52

TABLE XVI. Summary of standard hull pads.

PLATE BRACKET ID	DIMENSION A	DIMENSION B	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	
1	5.0000	6.0000	0.2500	8
2	5.0000	7.0000	0.2500	8
3	5.0000	8.0000	0.2500	4
4	6.0000	6.0000	0.2500	8
5	6.0000	7.0000	0.2500	12
6	6.0000	8.0000	0.2500	4
7	7.0000	6.0000	0.2500	16
8	7.0000	7.0000	0.2500	12
9	7.0000	8.0000	0.2500	4
10	7.0000	9.0000	0.2500	4
11	8.0000	7.0000	0.2500	4
12	8.0000	8.0000	0.2500	4
13	8.0000	9.0000	0.2500	12
14	8.0000	10.0000	0.2500	4
15	8.0000	11.0000	0.2500	4
16	9.0000	6.0000	0.2500	8
17	9.0000	7.0000	0.2500	4
18	9.0000	8.0000	0.2500	16
19	9.0000	9.0000	0.2500	16
20	9.0000	10.0000	0.2500	16
21	10.0000	8.0000	0.2500	4
22	10.0000	9.0000	0.2500	4
23	11.0000	6.0000	0.2500	8
24	11.0000	7.0000	0.2500	8
25	11.0000	8.0000	0.2500	12
26	11.0000	10.0000	0.2500	8
27	11.0000	11.0000	0.2500	4
28	13.0000	6.0000	0.2500	8
29	13.0000	7.0000	0.2500	8
30	13.0000	9.0000	0.2500	11
31	13.0000	11.0000	0.2500	12
32	13.0000	12.0000	0.2500	4
33	13.0000	13.0000	0.2500	4
34	15.0000	7.0000	0.2500	3
35	15.0000	8.0000	0.2500	3
36	15.0000	9.0000	0.2500	9

TABLE XVI. Summary of standard hull pads. - Continued

PLATE BRACKET ID	DIMENSION A	DIMENSION B	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	
37	15.0000	10.0000	0.2500	3
38	15.0000	11.0000	0.2500	3
39	17.0000	8.0000	0.2500	6
40	17.0000	9.0000	0.2500	6
41	17.0000	10.0000	0.2500	9
42	17.0000	13.0000	0.2500	3
43	18.0000	13.0000	0.2500	6
44	19.0000	8.0000	0.2500	3
45	19.0000	9.0000	0.2500	3
46	19.0000	10.0000	0.2500	9
47	19.0000	14.0000	0.2500	3
48	20.0000	14.0000	0.2500	9
49	22.0000	11.0000	0.2500	12
50	22.0000	15.0000	0.2500	3
51	23.0000	11.0000	0.2500	3
52	23.0000	15.0000	0.2500	3
53	5.0000	6.0000	0.5000	8
54	5.0000	7.0000	0.5000	8
55	5.0000	8.0000	0.5000	4
56	6.0000	6.0000	0.5000	8
57	6.0000	7.0000	0.5000	12
58	6.0000	8.0000	0.5000	4
59	7.0000	6.0000	0.5000	16
60	7.0000	7.0000	0.5000	12
61	7.0000	8.0000	0.5000	4
62	7.0000	9.0000	0.5000	4
63	8.0000	7.0000	0.5000	4
64	8.0000	8.0000	0.5000	4
65	8.0000	9.0000	0.5000	12
66	8.0000	10.0000	0.5000	4
67	8.0000	11.0000	0.5000	4
68	9.0000	6.0000	0.5000	8
69	9.0000	7.0000	0.5000	4
70	9.0000	8.0000	0.5000	16
71	9.0000	9.0000	0.5000	16
72	9.0000	10.0000	0.5000	16

TABLE XVI. Summary of standard hull pads. - Continued

PLATE BRACKET ID	DIMENSION A	DIMENSION B	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	
73	10.0000	8.0000	0.5000	4
74	10.0000	9.0000	0.5000	4
75	11.0000	6.0000	0.5000	8
76	11.0000	7.0000	0.5000	8
77	11.0000	8.0000	0.5000	12
78	11.0000	10.0000	0.5000	8
79	11.0000	11.0000	0.5000	4
80	13.0000	6.0000	0.5000	8
81	13.0000	7.0000	0.5000	8
82	13.0000	9.0000	0.5000	12
83	13.0000	11.0000	0.5000	12
84	13.0000	12.0000	0.5000	4
85	13.0000	13.0000	0.5000	4
86	15.0000	7.0000	0.5000	4
87	15.0000	8.0000	0.5000	4
88	15.0000	9.0000	0.5000	12
89	15.0000	10.0000	0.5000	4
90	15.0000	11.0000	0.5000	4
91	17.0000	8.0000	0.5000	8
92	17.0000	9.0000	0.5000	8
93	17.0000	10.0000	0.5000	12
94	17.0000	13.0000	0.5000	4
95	18.0000	13.0000	0.5000	8
96	19.0000	8.0000	0.5000	4
97	19.0000	9.0000	0.5000	4
98	19.0000	10.0000	0.5000	12
99	19.0000	14.0000	0.5000	4
100	20.0000	14.0000	0.5000	12
101	22.0000	11.0000	0.5000	16
102	22.0000	15.0000	0.5000	4
103	23.0000	11.0000	0.5000	4
104	23.0000	15.0000	0.5000	4
105	5.0000	6.0000	0.7500	2
106	5.0000	7.0000	0.7500	2
107	5.0000	8.0000	0.7500	1
108	6.0000	6.0000	0.7500	2

TABLE XVI. Summary of standard hull pads. - Continued

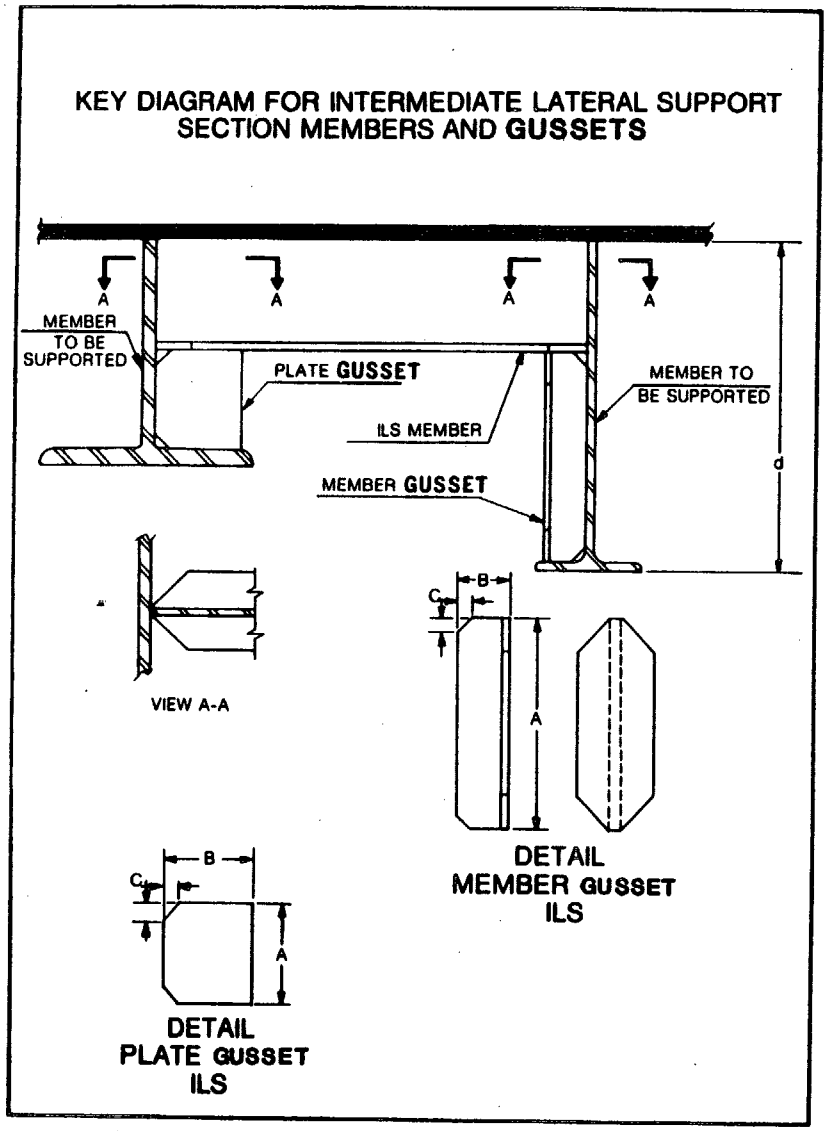
PLATE BRACKET ID	DIMENSION A	DIMENSION B	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	
109	6.0000	7.0000	0.7500	3
110	6.0000	8.0000	0.7500	1
111	7.0000	6.0000	0.7500	4
112	7.0000	7.0000	0.7500	3
113	7.0000	8.0000	0.7500	1
114	7.0000	9.0000	0.7500	1
115	8.0000	7.0000	0.7500	3
116	8.0000	8.0000	0.7500	3
117	8.0000	9.0000	0.7500	9
118	8.0000	10.0000	0.7500	3
119	8.0000	11.0000	0.7500	3
120	9.0000	6.0000	0.7500	6
121	9.0000	7.0000	0.7500	3
122	9.0000	8.0000	0.7500	12
123	9.0000	9.0000	0.7500	12
124	9.0000	10.0000	0.7500	12
125	10.0000	8.0000	0.7500	4
126	10.0000	9.0000	0.7500	4
127	11.0000	6.0000	0.7500	8
128	11.0000	7.0000	0.7500	8
129	11.0000	8.0000	0.7500	12
130	11.0000	10.0000	0.7500	8
131	11.0000	11.0000	0.7500	4
132	13.0000	6.0000	0.7500	8
133	13.0000	7.0000	0.7500	8
134	13.0000	9.0000	0.7500	12
135	13.0000	11.0000	0.7500	12
136	13.0000	12.0000	0.7500	4
137	13.0000	13.0000	0.7500	4
138	15.0000	7.0000	0.7500	4
139	15.0000	8.0000	0.7500	4
140	15.0000	9.0000	0.7500	12
141	15.0000	10.0000	0.7500	4
142	15.0000	11.0000	0.7500	4
143	17.0000	8.0000	0.7500	8
144	17.0000	9.0000	0.7500	8

TABLE XVI. Summary of standard hull pads. - Continued

PLATE BRACKET ID	DIMENSION A	DIMENSION B	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	
145	17.0000	10.0000	0.7500	12
146	17.0000	13.0000	0.7500	4
147	18.0000	13.0000	0.7500	8
148	19.0000	8.0000	0.7500	4
149	19.0000	9.0000	0.7500	4
150	19.0000	10.0000	0.7500	12
151	19.0000	14.0000	0.7500	4
152	20.0000	14.0000	0.7500	12
153	22.0000	11.0000	0.7500	16
154	22.0000	15.0000	0.7500	4
155	23.0000	11.0000	0.7500	4
156	23.0000	15.0000	0.7500	4
157	10.0000	8.0000	1.0000	1
158	10.0000	9.0000	1.0000	1
159	11.0000	6.0000	1.0000	2
160	11.0000	7.0000	1.0000	2
161	11.0000	8.0000	1.0000	3
162	11.0000	10.0000	1.0000	2
163	11.0000	11.0000	1.0000	1
164	13.0000	6.0000	1.0000	2
165	13.0000	7.0000	1.0000	2
166	13.0000	9.0000	1.0000	5
167	13.0000	11.0000	1.0000	3
168	13.0000	12.0000	1.0000	1
169	13.0000	13.0000	1.0000	1
170	15.0000	7.0000	1.0000	3
171	15.0000	8.0000	1.0000	3
172	15.0000	9.0000	1.0000	9
173	15.0000	10.0000	1.0000	3
174	15.0000	11.0000	1.0000	3
175	17.0000	8.0000	1.0000	6
176	17.0000	9.0000	1.0000	6
177	17.0000	10.0000	1.0000	9
178	17.0000	13.0000	1.0000	3
179	18.0000	13.0000	1.0000	6
180	19.0000	8.0000	1.0000	3

TABLE XVI. Summary of standard hull pads. - Continued

PLATE BRACKET ID	DIMENSION A	DIMENSION B	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	
181	19.0000	9.0000	1.0000	3
182	19.0000	10.0000	1.0000	9
183	19.0000	14.0000	1.0000	3
184	20.0000	14.0000	1.0000	9
185	22.0000	11.0000	1.0000	12
186	22.0000	15.0000	1.0000	3
187	23.0000	11.0000	1.0000	3
188	23.0000	15.0000	1.0000	3



SH 12968

Algorithms for Intermediate Lateral Support Section Member and Gussets

$A'_x \geq \frac{1}{5} A_x$

$d' \geq \frac{1}{3} d$

* A: $A = d - d' - t_f$

T:
- If $A > 6"$ cut from shape of ILS member
- If $3" \leq A \leq 6"$ use plate gusset $T = t_w$
- If $A < 3$ use ILS plate member on next figure
- If $T < .1875"$ _____ $T = .1875"$

B: $B = .5(w_f - t_w) - .25"$

C:
- If $t_w > k - t_f$ _____ $C = t_w + .125"$
- If $t_w < k - t_f$ _____ $C = k - t_f + .125"$
- If $C > .5B$ _____ $C = .5B$
- If $C < .5"$ and $B > 1.0"$ _____ $C = .5"$

NOTE:

1. d, t_f, w_f, k, & t_w are dimensions of member to be supported
2. d' = depth of ILS member
3. A_x = Cross Sectional Area of Member to be Supported
4. A'_x = Cross Sectional Area of ILS Member
5. * indicates a neat fit dimension
6. **Radius of $\frac{C}{2}$ is acceptable.**

FIGURE 13. Key diagram and algorithms for intermediate lateral support section members and gussets.

TABLE XVII. Standard intermediate lateral support (ILS) index.

MEMBER TO BE SUPPORTED				INTERMEDIATE LATERAL SUPPORT MEMBER					
				SHALLOWEST ILS MEMBER		LIGHTEST ILS MEMBER		PLATE ILS	IN-LINE BRACKET
ID	NOMINAL SIZE IN x IN x LBS/FT			MEMBER ID (TABLE 1)	GUSSET ID (TABLE 18)	MEMBER ID (TABLE 1)	GUSSET ID (TABLE 18)	ID (TABLE 19)	ILS ID (TABLE 9)
1	4 x 4 x 5.0 T			0	0	0	0	1	1
2	4 x 4 x 6.5 T			0	0	0	0	2	1
3	4 x 4 x 7.5 T			0	0	0	0	2	1
4	4 x 5 1/4 x 9.0 T			0	0	0	0	22	15
5	4 x 4 x 13.0 I-T			0	0	0	0	23	24
6	5 x 4 x 6.0 T			0	0	0	0	3	2
7	5 x 4 x 7.5 T			0	0	0	0	4	2
8	5 x 4 x 8.5 T			0	0	0	0	4	2
9	5 x 4 x 9.5 T			0	0	0	0	4	2
10	5 x 5 x 16.0 I-T			0	0	0	0	24	12
11	5 x 5 x 19.0 I-T			0	0	0	0	47	35
12	6 x 4 x 7.0 T			0	0	0	0	6	4
13	6 x 4 x 7.0 T			0	0	0	0	7	4
14	6 x 4 x 9.0 I-T			0	0	0	0	5	3
15	6 x 4 x 9.5 T			0	0	0	0	7	4
16	6 x 4 x 11.0 T			0	0	0	0	7	27
17	6 x 4 x 12.0 I-T			0	0	0	0	8	5
18	6 x 6 x 15.0 I-T			0	0	0	0	25	19
19	6 x 4 x 16.0 I-T			0	0	0	0	26	28
20	6 x 6 x 20.0 I-T			0	0	0	0	48	43
21	7 x 5 x 11.0 T			0	0	0	0	9	13
22	7 x 5 x 13.0 T			1	65	1	65	9	36
23	7 x 6 3/4 x 15.0 T			0	0	0	0	28	47
24	7 x 6 3/4 x 17.0 T			1	72	1	72	28	47
25	7 x 6 3/4 x 19.0 T			1	72	1	72	29	47
26	7 x 8 x 21.5 T			0	0	0	0	27	56
27	7 x 8 x 24.0 T			0	0	0	0	49	56
28	8 x 4 x 10.0 I-T			1	61	1	61	10	6
29	8 x 4 x 13.0 I-T			1	62	1	62	10	6
30	8 x 5 1/2 x 13.0 T			1	66	1	66	11	16
31	8 x 4 x 15.0 I-T			1	62	1	62	12	7
32	8 x 5 1/2 x 15.5 T			1	66	1	66	11	39
33	8 x 5 1/4 x 18.0 I-T			1	67	1	67	33	17
34	8 x 7 x 18.0 T			1	77	1	77	31	52
35	8 x 7 x 20.0 T			1	77	1	77	32	52

TABLE XVII. Standard intermediate lateral support (ILS) index. - Continued

MEMBER TO BE SUPPORTED				INTERMEDIATE LATERAL SUPPORT MEMBER					
				SHALLOWEST ILS MEMBER		LIGHTEST ILS MEMBER		PLATE ILS	IN-LINE BRACKET
ID	NOMINAL SIZE IN x IN x LBS/FT			MEMBER ID (TABLE 1)	GUSSET ID (TABLE 18)	MEMBER ID (TABLE 1)	GUSSET ID (TABLE 18)	ID (TABLE 19)	ILS ID (TABLE 9)
36	8 x 5 1/4 x 21.0 I-T			1	67	1	67	33	17
37	8 x 7 x 22.5 T			1	77	1	77	32	52
38	8 x 6 1/4 x 24.0 I-T			1	73	1	73	30	21
39	8 x 7 1/8 x 25.0 T			1	77	1	77	32	95
40	8 x 6 1/2 x 28.0 I-T			2	73	6	72	50	48
41	8 x 7 1/8 x 28.5 T			2	76	6	75	51	94
42	8 x 8 x 31.0 I-T			2	80	2	80	52	57
43	9 x 6 x 17.5 T			1	68	1	68	13	44
44	9 x 6 x 20.0 T			1	68	1	68	34	44
45	10 x 4 x 12.0 I-T			1	63	1	63	14	8
46	10 x 4 x 15.0 I-T			1	64	1	64	14	8
47	10 x 4 x 17.0 I-T			1	64	1	64	15	9
48	10 x 4 x 19.0 I-T			1	64	1	64	15	9
49	10 x 5 3/4 x 22.0 I-T			1	71	1	71	35	20
50	10 x 5 3/4 x 26.0 I-T			2	71	6	69	35	45
51	10 x 5 3/4 x 30.0 I-T			2	71	6	70	35	45
52	10 x 8 x 33.0 I-T			3	83	13	79	54	59
53	10 x 8 x 39.0 I-T			4	84	8	82	53	58
54	10 x 8 x 45.0 I-T			4	85	14	81	64	59
55	12 x 4 x 14.0 I-T			2	3	6	1	16	10
56	12 x 4 x 16.0 I-T			2	3	6	2	16	10
57	12 x 4 x 19.0 I-T			3	4	6	2	17	11
58	12 x 4 x 22.0 I-T			5	5	6	2	17	34
59	12 x 6 1/2 x 26.0 I-T			4	19	6	16	18	22
60	12 x 6 1/2 x 30.0 I-T			5	17	6	16	36	49
61	12 x 6 1/2 x 35.0 I-T			7	15	13	74	37	49
62	12 x 8 x 40.0 I-T			4	35	8	32	55	60
63	12 x 8 x 45.0 I-T			4	35	14	86	56	60
64	12 x 8 1/8 x 50.0 I-T			5	34	28	81	57	61
65	12 x 10 x 53.0 I-T			5	46	21	88	65	63
66	12 x 10 x 58.0 I-T			5	46	0	0	66	64
67	14 x 5 x 22.0 I-T			6	6	6	6	19	14
68	14 x 5 x 26.0 I-T			6	7	6	7	19	37
69	14 x 6 3/4 x 30.0 I-T			6	21	6	21	39	50
70	14 x 6 3/4 x 34.0 I-T			7	22	13	18	40	51

TABLE XVII. Standard intermediate lateral support (ILS) index. - Continued

MEMBER TO BE SUPPORTED			INTERMEDIATE LATERAL SUPPORT MEMBER					
			SHALLOWEST ILS MEMBER		LIGHTEST ILS MEMBER		PLATE ILS	IN-LINE BRACKET
ID	NOMINAL SIZE IN x IN x LBS/FT		MEMBER ID (TABLE 1)	GUSSET ID (TABLE 18)	MEMBER ID (TABLE 1)	GUSSET ID (TABLE 18)	ID (TABLE 19)	ILS ID (TABLE 9)
71	14	x 6 3/4 x 38.0 I-T	10	23	8	20	41	51
72	14	x 8 x 43.0 I-T	10	36	14	33	38	62
73	14	x 8 x 48.0 I-T	10	36	28	85	58	62
74	16	x 5 1/2 x 26.0 I-T	14	8	13	9	20	18
75	16	x 5 1/2 x 31.0 I-T	14	10	13	9	20	41
76	16	x 7 x 36.0 I-T	14	26	14	26	42	53
77	16	x 7 x 40.0 I-T	14	26	14	26	43	54
78	16	x 7 x 45.0 I-T	14	26	14	26	43	54
79	16	x 7 1/8 x 50.0 I-T	18	25	28	24	43	97
80	16	x 7 1/8 x 57.0 I-T	18	25	45	78	59	97
81	16	x 10 1/4 x 67.0 I-T	18	50	55	87	60	111
82	16	x 10 1/4 x 77.0 I-T	20	49	32	48	67	112
83	16	x 10 3/8 x 89.0 I-T	20	49	34	47	67	162
84	18	x 6 x 35.0 I-T	14	14	13	11	21	46
85	18	x 6 x 40.0 I-T	18	12	15	13	44	46
86	18	x 7 1/2 x 50.0 I-T	17	31	28	29	45	55
87	18	x 7 1/2 x 60.0 I-T	20	30	45	28	61	99
88	18	x 7 5/8 x 71.0 I-T	20	30	46	27	61	99
89	18	x 11 1/8 x 86.0 I-T	20	56	43	52	68	113
90	18	x 11 1/8 x 97.0 I-T	20	57	44	51	69	163
91	18	x 11 1/4 x 106.0 I-T	26	54	26	54	73	164
92	18	x 11 1/4 x 119.0 I-T	27	55	38	53	73	215
93	21	x 8 1/4 x 62.0 I-T	24	44	30	41	46	107
94	21	x 8 1/4 x 68.0 I-T	25	45	55	38	62	107
95	21	x 8 1/4 x 73.0 I-T	38	42	46	40	63	108
96	21	x 8 3/8 x 83.0 I-T	38	42	47	39	63	158
97	21	x 8 3/8 x 93.0 I-T	38	43	57	37	71	158
98	21	x 12 1/4 x 101.0 I-T	38	60	36	58	70	114
99	21	x 12 3/8 x 111.0 I-T	38	60	37	59	72	165

TABLE XVIII. Summary of standard ILS gussets.

ILS GUSSET ID	ILS MEMBER ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
		IN	IN	IN	IN	
1	6	6.5000	1.5000	0.7500	N/A	1
2	6	6.7500	1.5000	0.7500	N/A	3
3	2	7.5000	1.5000	0.7500	N/A	2
4	3	7.5000	1.5000	0.7500	N/A	1
5	5	7.5000	1.5000	0.7500	N/A	1
6	6	8.2500	2.0000	0.7500	N/A	2
7	6	8.5000	2.0000	0.7500	N/A	2
8	14	9.2500	2.2500	1.0000	N/A	1
9	13	9.2500	2.2500	1.0000	N/A	2
10	14	9.5000	2.2500	1.0000	N/A	1
11	13	11.2500	2.5000	1.0000	N/A	1
12	18	11.2500	2.5000	1.0000	N/A	1
13	15	11.2500	2.5000	1.0000	N/A	1
14	14	11.2500	2.5000	1.0000	N/A	1
15	7	6.7500	2.7500	0.7500	N/A	1
16	6	6.7500	2.7500	0.7500	N/A	2
17	5	7.5000	2.7500	0.7500	N/A	1
18	13	7.5000	2.7500	0.7500	N/A	1
19	4	7.7500	2.7500	0.7500	N/A	1
20	8	8.5000	2.7500	0.7500	N/A	1
21	6	8.5000	2.7500	0.7500	N/A	2
22	7	8.5000	2.7500	0.7500	N/A	1
23	10	8.5000	2.7500	0.7500	N/A	1
24	28	7.5000	3.0000	1.0000	N/A	1
25	18	9.5000	3.0000	1.0000	N/A	2
26	14	9.5000	3.0000	1.0000	N/A	6
27	46	7.5000	3.2500	1.0000	N/A	1
28	45	7.5000	3.2500	1.0000	N/A	1
29	28	9.5000	3.2500	1.0000	N/A	1
30	20	11.2500	3.2500	1.0000	N/A	2
31	17	11.2500	3.2500	1.0000	N/A	1
32	8	6.2500	3.5000	1.0000	N/A	1
33	14	7.0000	3.5000	1.0000	N/A	1
34	5	7.2500	3.5000	1.0000	N/A	1
35	4	7.2500	3.5000	1.0000	N/A	2
36	10	8.0000	3.5000	1.0000	N/A	2

TABLE XVIII. Summary of standard ILS gussets. - Continued

ILS GUSSET ID	ILS MEMBER ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
		IN	IN	IN	IN	
37	57	8.5000	3.5000	1.0000	N/A	1
38	55	8.5000	3.5000	1.0000	N/A	1
39	47	10.2500	3.5000	1.0000	N/A	1
40	46	10.5000	3.5000	1.0000	N/A	1
41	30	12.5000	3.5000	1.0000	N/A	1
42	38	12.5000	3.5000	1.0000	N/A	2
43	38	12.7500	3.5000	1.0000	N/A	1
44	24	13.2500	3.5000	1.0000	N/A	1
45	25	13.2500	3.5000	1.0000	N/A	1
46	5	7.2500	4.5000	1.0000	N/A	2
47	34	7.7500	4.5000	1.0000	N/A	1
48	32	7.7500	4.5000	1.0000	N/A	1
49	20	9.5000	4.5000	1.0000	N/A	2
50	18	9.5000	4.5000	1.0000	N/A	1
51	44	8.7500	5.0000	1.0000	N/A	1
52	43	8.7500	5.0000	1.0000	N/A	1
53	38	9.7500	5.0000	1.0000	N/A	1
54	26	10.7500	5.0000	1.0000	N/A	2
55	27	11.0000	5.0000	1.0000	N/A	1
56	20	11.2500	5.0000	1.0000	N/A	1
57	20	11.5000	5.0000	1.0000	N/A	1
58	36	12.2500	5.5000	1.0000	N/A	1
59	37	12.5000	5.5000	1.0000	N/A	1
60	38	12.5000	5.5000	1.0000	N/A	2
61	N/A	3.5000	1.5000	0.7500	0.2500	2
62	N/A	3.7500	1.5000	0.7500	0.2500	4
63	N/A	5.5000	1.5000	0.7500	0.2500	2
64	N/A	5.7500	1.5000	0.7500	0.2500	6
65	N/A	2.5000	2.0000	0.7500	0.2500	2
66	N/A	3.5000	2.2500	1.0000	0.2500	4
67	N/A	3.7500	2.2500	0.7500	0.2500	4
68	N/A	4.2500	2.5000	1.0000	0.2500	4
69	N/A	4.7500	2.5000	0.7500	0.2500	1
70	N/A	5.0000	2.5000	0.7500	0.2500	1
71	N/A	5.7500	2.5000	0.7500	0.2500	4
72	N/A	2.5000	2.7500	0.7500	0.2500	5

TABLE XVIII. Summary of standard ILS gussets. - Continued

ILS GUSSET ID	ILS MEMBER ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
		IN	IN	IN	IN	
73	N/A	3.5000	2.7500	0.7500	0.2500	3
74	N/A	5.7500	2.7500	0.7500	0.2500	1
75	N/A	2.5000	3.0000	0.7500	0.2500	1
76	N/A	3.5000	3.0000	0.7500	0.2500	1
77	N/A	3.5000	3.0000	1.0000	0.2500	8
78	N/A	5.7500	3.0000	1.0000	0.2500	1
79	N/A	3.2500	3.5000	1.0000	0.2500	1
80	N/A	3.5000	3.5000	0.7500	0.2500	2
81	N/A	3.5000	3.5000	1.0000	0.2500	2
82	N/A	4.2500	3.5000	0.7500	0.2500	1
83	N/A	5.0000	3.5000	1.0000	0.2500	1
84	N/A	5.2500	3.5000	0.7500	0.2500	1
85	N/A	5.2500	3.5000	1.0000	0.2500	2
86	N/A	5.5000	3.5000	1.0000	0.2500	1
87	N/A	3.7500	4.5000	1.0000	0.2500	1
88	N/A	4.5000	4.5000	1.0000	0.2500	1

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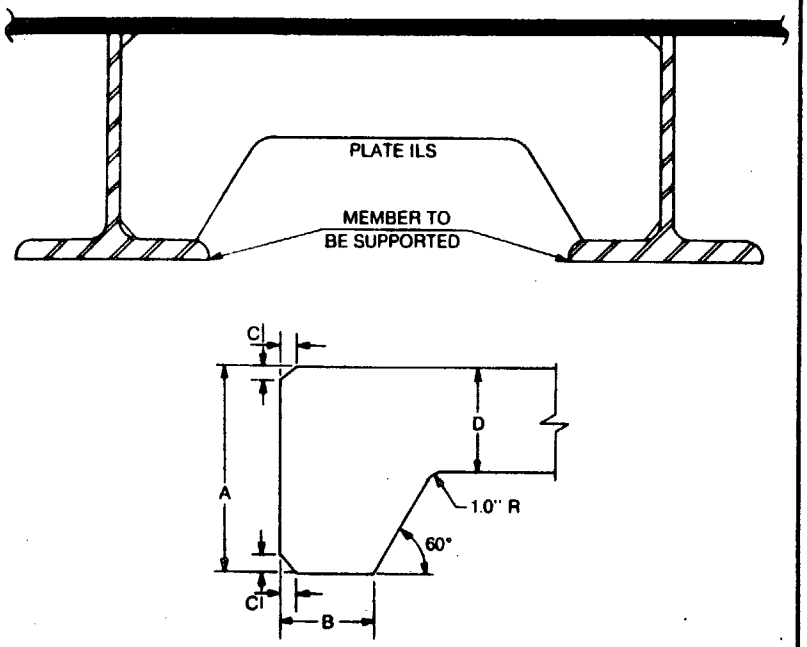
KEY DIAGRAM FOR
INTERMEDIATE LATERAL SUPPORT PLATE MEMBERS



DETAIL
PLATE ILS

SH 12969

Algorithms for Intermediate Lateral Support Plate Members

* A:	$A = d - t_f$	
B:	$B = .5(w_f - t_w) - .25"$	
C:	If $t_w < k - t_f$	$C = k - t_f + .125"$
	If $t_w > k - t_f$	$C = t_w + .125"$
	If $C > .5B$	$C = .5B$
	If $C < .5"$ and $B > 1.0"$	$C = .5"$
D:	$D \geq .5d$	
T:	$T \geq \frac{A_x}{5D}$	
	If $T < .1875"$	$T = .1875"$

NOTE:

1. d, t_f, w_f, k & t_w are dimensions of member to be supported
2. A_x = Cross Sectional Area of Member to be Supported
3. * indicates a neat fit dimension
4. **Radius of $\frac{C}{2}$ is acceptable.**

FIGURE 14. Key diagram and algorithms for intermediate support plate members.

TABLE XIX. Summary of standard ILS plate members.

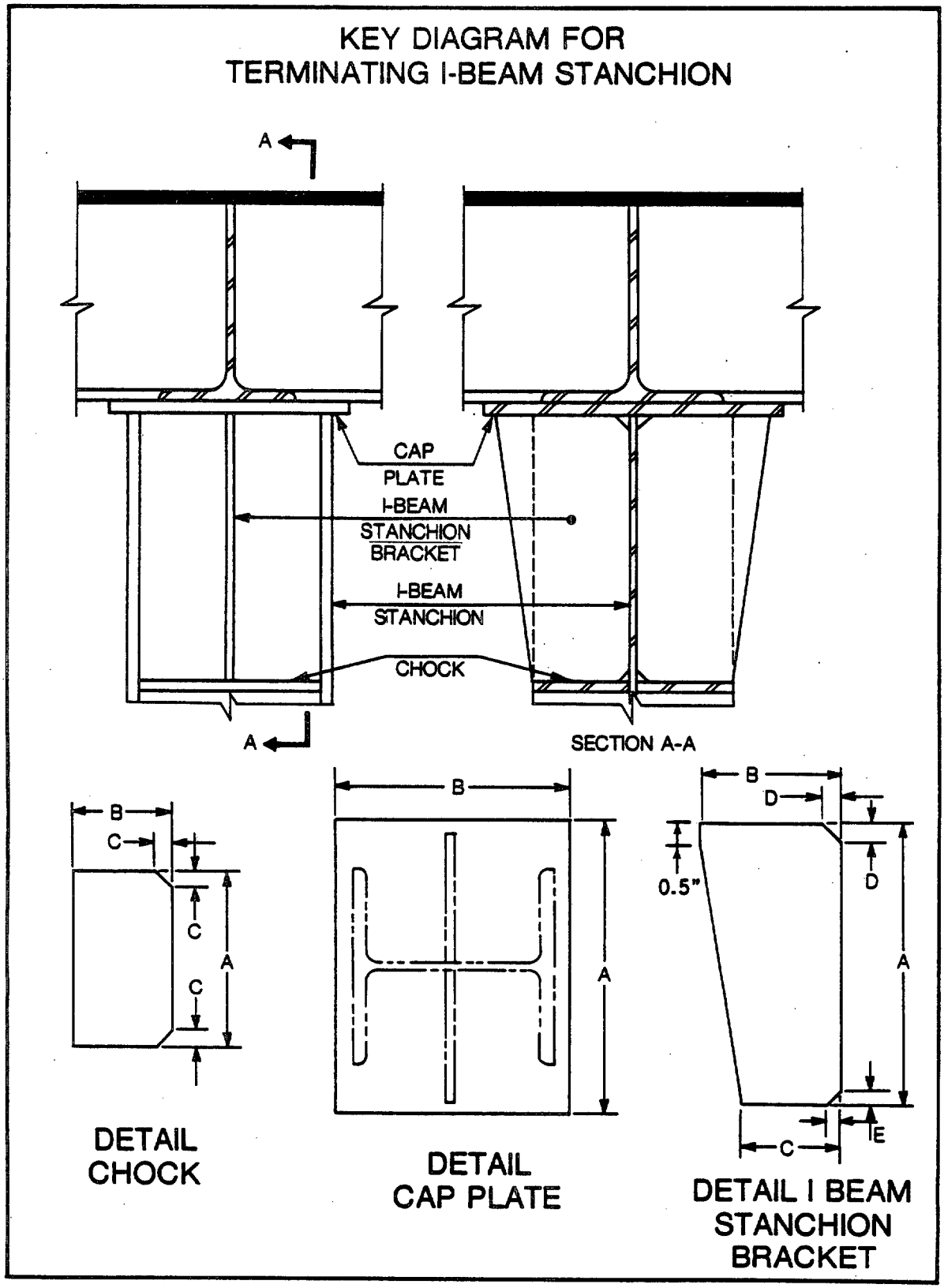
ILS PLATE ID	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	IN	
1	3.5000	1.5000	0.7500	2.0000	0.2500	1
2	3.5000	1.5000	0.7500	2.2500	0.2500	2
3	4.5000	1.5000	0.7500	2.5000	0.2500	1
4	4.5000	1.5000	0.7500	2.7500	0.2500	3
5	5.5000	1.5000	0.5000	3.0000	0.2500	1
6	5.5000	1.5000	0.7500	3.0000	0.2500	1
7	5.5000	1.5000	0.7500	3.2500	0.2500	3
8	5.7500	1.5000	0.5000	3.2500	0.2500	1
9	6.5000	2.0000	0.7500	3.5000	0.2500	2
10	7.5000	1.5000	0.7500	4.0000	0.2500	2
11	7.5000	2.2500	1.0000	4.0000	0.2500	2
12	7.7500	1.5000	0.7500	4.2500	0.2500	1
13	8.2500	2.5000	1.0000	4.5000	0.2500	1
14	9.5000	1.5000	0.7500	5.0000	0.2500	2
15	9.7500	1.5000	0.7500	5.2500	0.2500	2
16	11.5000	1.5000	0.7500	6.0000	0.2500	2
17	11.7500	1.5000	0.7500	6.2500	0.2500	2
18	11.7500	2.7500	0.7500	6.2500	0.2500	1
19	13.2500	2.0000	0.7500	7.0000	0.2500	2
20	15.2500	2.2500	1.0000	8.0000	0.2500	2
21	17.2500	2.5000	1.0000	9.0000	0.2500	1
22	3.5000	2.2500	0.7500	2.2500	0.3750	1
23	3.7500	1.5000	0.5000	2.2500	0.3750	1
24	4.5000	2.0000	0.7500	2.7500	0.3750	1
25	5.5000	2.5000	0.5000	3.0000	0.3750	1
26	5.7500	1.5000	0.5000	3.2500	0.3750	1
27	6.2500	3.5000	1.0000	3.5000	0.3750	1
28	6.5000	2.7500	0.7500	3.5000	0.3750	2
29	6.5000	2.7500	0.7500	3.7500	0.3750	1
30	7.5000	2.7500	0.7500	4.0000	0.3750	1
31	7.5000	3.0000	1.0000	4.0000	0.3750	1
32	7.5000	3.0000	1.0000	4.2500	0.3750	3
33	7.7500	2.2500	0.7500	4.2500	0.3750	2
34	8.2500	2.5000	1.0000	4.5000	0.3750	1
35	9.7500	2.5000	0.7500	5.2500	0.3750	3
36	11.7500	2.7500	0.7500	6.2500	0.3750	1

TABLE XIX. Summary of standard ILS plate members. - Continued

ILS PLATE ID	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	IN	
37	11.7500	2.7500	0.7500	6.5000	0.3750	1
38	13.0000	3.5000	1.0000	7.0000	0.3750	1
39	13.2500	2.7500	0.7500	7.0000	0.3750	1
40	13.5000	2.7500	0.7500	7.0000	0.3750	1
41	13.5000	2.7500	0.7500	7.2500	0.3750	1
42	15.2500	3.0000	1.0000	8.0000	0.3750	1
43	15.5000	3.0000	1.0000	8.2500	0.3750	3
44	17.2500	2.5000	1.0000	9.0000	0.3750	1
45	17.2500	3.2500	1.0000	9.0000	0.3750	1
46	20.2500	3.5000	1.0000	10.5000	0.3750	1
47	4.5000	2.0000	0.7500	2.7500	0.5000	1
48	5.7500	2.5000	0.7500	3.2500	0.5000	1
49	6.2500	3.5000	1.0000	3.5000	0.5000	1
50	7.5000	2.7500	0.7500	4.2500	0.5000	1
51	7.5000	3.0000	0.7500	4.2500	0.5000	1
52	7.5000	3.5000	0.7500	4.2500	0.5000	1
53	9.2500	3.5000	0.7500	5.0000	0.5000	1
54	9.2500	3.5000	1.0000	5.0000	0.5000	1
55	11.2500	3.5000	1.0000	6.0000	0.5000	1
56	11.2500	3.5000	1.0000	6.2500	0.5000	1
57	11.5000	3.5000	1.0000	6.2500	0.5000	1
58	13.0000	3.5000	1.0000	7.0000	0.5000	1
59	15.5000	3.0000	1.0000	8.2500	0.5000	1
60	15.5000	4.5000	1.0000	8.2500	0.5000	1
61	17.5000	3.2500	1.0000	9.2500	0.5000	2
62	20.2500	3.5000	1.0000	10.7500	0.5000	1
63	20.5000	3.5000	1.0000	10.7500	0.5000	2
64	9.2500	3.5000	1.0000	5.2500	0.6250	1
65	11.2500	4.5000	1.0000	6.2500	0.6250	1
66	11.5000	4.5000	1.0000	6.2500	0.6250	1
67	15.7500	4.5000	1.0000	8.5000	0.6250	2
68	17.5000	5.0000	1.0000	9.2500	0.6250	1
69	17.5000	5.0000	1.0000	9.5000	0.6250	1
70	20.5000	5.5000	1.0000	10.7500	0.6250	1
71	20.5000	3.5000	1.0000	11.0000	0.6250	1
72	20.5000	5.5000	1.0000	11.0000	0.6250	1

TABLE XIX. Summary of standard ILS plate members. - Continued

ILS PLATE ID	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	IN	
73	17.7500	5.0000	1.0000	9.5000	0.7500	2



SH 12970

FIGURE 15. Key diagram and algorithm for terminating I-beam stanchion bracket, cap plate and chock.

TABLE XX. Standard terminating I-beam stanchion index.

ID	I-BEAM STANCHION MEMBER IN x IN x LBS/FT				I-BEAM STANCHION BRACKET ID (TABLE 21)	I-BEAM STANCHION SOLE/CAP PLATE ID (TABLE 22)	I-BEAM STANCHION CHOCK ID (TABLE 23)
100	4	x 4	x 13.0	I	2	1	1
101	6	x 6	x 15.0	I	1	2	2
102	6	x 6	x 20.0	I	3	3	3
103	6	x 6	x 25.0	I	4	3	4
104	8	x 8	x 31.0	I	5	4	5
105	8	x 8	x 35.0	I	5	5	5
106	8	x 8	x 40.0	I	5	6	6
107	8	x 8	x 48.0	I	7	10	9
108	8	x 8	x 58.0	I	11	14	13
109	8	x 8	x 67.0	I	11	18	18
110	10	x 10	x 49.0	I	6	7	7
111	10	x 10	x 54.0	I	6	8	7
112	10	x 10	x 60.0	I	8	11	10
113	10	x 10	x 68.0	I	8	15	14
114	10	x 10	x 77.0	I	12	15	15
115	10	x 10	x 88.0	I	12	19	19
116	10	x 10	x 100.0	I	16	22	22
117	10	x 10	x 112.0	I	20	26	26
118	12	x 12	x 65.0	I	9	9	8
119	12	x 12	x 72.0	I	9	12	11
120	12	x 12	x 79.0	I	9	12	11
121	12	x 12	x 87.0	I	13	16	16
122	12	x 12	x 96.0	I	14	20	20
123	12	x 12	x 106.0	I	14	20	20
124	12	x 12	x 120.0	I	17	23	23
125	12	x 12	x 136.0	I	21	27	27
126	12	x 12	x 152.0	I	22	30	30
127	12	x 12	x 170.0	I	24	32	32
128	12	x 12	x 190.0	I	27	34	34
129	12	x 12	x 210.0	I	29	36	36
130	14	x 14 1/2	x 90.0	I	10	13	12
131	14	x 14 1/2	x 99.0	I	10	17	17
132	14	x 14 1/2	x 109.0	I	15	17	17
133	14	x 14 1/2	x 120.0	I	15	21	21
134	14	x 14 1/2	x 132.0	I	18	24	24
135	14	x 16	x 145.0	I	19	25	25

TABLE XX. Standard terminating I-beam stanchion index. - Continued

ID	I-BEAM STANCHION MEMBER IN x IN x LBS/FT				I-BEAM STANCHION BRACKET ID (TABLE 21)	I-BEAM STANCHION SOLE/CAP PLATE ID (TABLE 22)	I-BEAM STANCHION CHOCK ID (TABLE 23)
136	14	x 16	x 159.0	I	19	28	28
137	14	x 16	x 176.0	I	23	29	29
138	14	x 16	x 193.0	I	25	31	31
139	14	x 16	x 211.0	I	26	33	33
140	14	x 16	x 233.0	I	28	35	35
141	14	x 16	x 257.0	I	30	37	37
142	14	x 16	x 283.0	I	31	38	38
143	14	x 16	x 311.0	I	32	39	39
144	14	x 16	x 342.0	I	33	40	40
145	14	x 16	x 370.0	I	34	41	41
146	14	x 16	x 398.0	I	35	42	42
147	14	x 16	x 426.0	I	35	43	43

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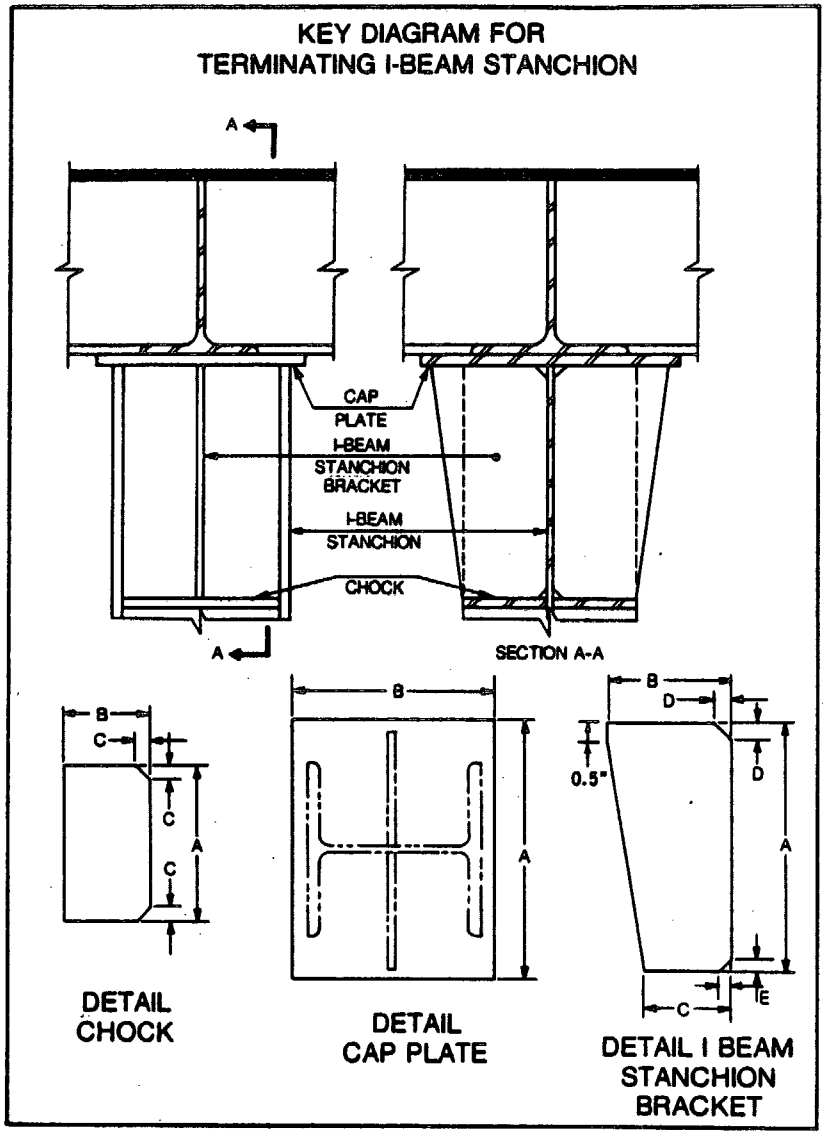


Algorithm for Terminating I Beam Stanchion Bracket

A: If $t_f > .5"$ ____ $A = 1.5d - t_f$
If $t_f < .5"$ ____ $A = 1.5d - .5"$

B: $B = .5(w_f - t_w) + 1.5"$

C: $C = .5(w_f - t_w)$

D: If $t_f > t_w$ ____ $D = t_w + .125"$
If $t_f \leq t_w$ ____ $D = t_f + .125"$
If $D > .5B$ ____ $D = .5B$
If $D < .5"$ and
$B > 1.0"$ ____ $D = .5"$

E: If $t_f > t_w$ ____ $E = t_w + .125"$
If $t_f \leq t_w$ ____ $E = t_f + .125"$
If $E > .5C$ ____ $D = .5C$
If $E < .5"$ and
$C > 1.0$ ____ $E = .5"$

T: $T = t_w$
If $T \leq .1875"$ ____ $T = .1875"$

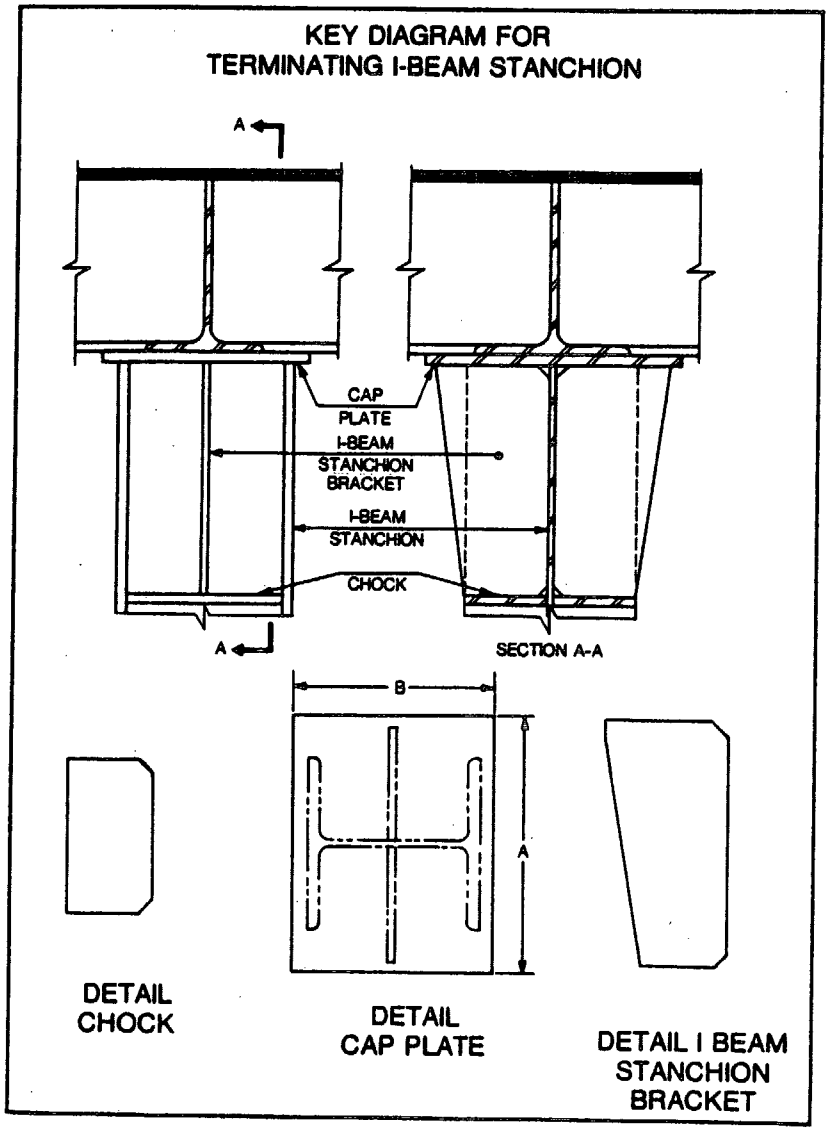
NOTE:
1. d, t_f, w_f & t_w are dimensions of I-Beam stanchion
2. Radius of C_{R2} is acceptable.

SH 131440

FIGURE 16. Key diagram and algorithm for terminating I-beam stanchion bracket.

TABLE XXI. Summary of standard I-beam stanchion brackets.

I-BEAM STANCHION BKT ID	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION E	DIMENSION D	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	IN	IN	
1	9.0000	4.5000	2.7500	0.5000	0.5000	0.2500	1
2	6.0000	3.5000	1.7500	0.5000	0.5000	0.3750	1
3	9.0000	4.5000	2.7500	0.5000	0.5000	0.3750	1
4	10.0000	4.5000	2.7500	0.5000	0.5000	0.3750	1
5	12.0000	5.5000	3.7500	0.5000	0.5000	0.3750	3
6	15.0000	6.5000	4.7500	0.5000	0.5000	0.3750	2
7	13.0000	5.5000	3.7500	0.7500	0.7500	0.5000	1
8	15.0000	6.5000	4.7500	0.7500	0.7500	0.5000	2
9	18.0000	7.5000	5.7500	0.7500	0.7500	0.5000	3
10	21.0000	9.0000	7.0000	0.7500	0.7500	0.5000	2
11	13.0000	5.5000	3.7500	0.7500	0.7500	0.6250	2
12	16.0000	6.5000	4.7500	0.7500	0.7500	0.6250	2
13	18.0000	7.5000	5.7500	0.7500	0.7500	0.6250	1
14	19.0000	7.5000	5.7500	0.7500	0.7500	0.6250	2
15	21.0000	9.0000	7.0000	0.7500	0.7500	0.6250	2
16	16.0000	6.5000	4.7500	1.0000	1.0000	0.7500	1
17	19.0000	7.5000	5.7500	1.0000	1.0000	0.7500	1
18	21.0000	9.0000	7.0000	1.0000	1.0000	0.7500	1
19	22.0000	9.0000	7.2500	1.0000	1.0000	0.7500	2
20	16.0000	6.5000	4.7500	1.0000	1.0000	0.8750	1
21	19.0000	7.5000	5.7500	1.0000	1.0000	0.8750	1
22	20.0000	7.5000	5.7500	1.0000	1.0000	0.8750	1
23	22.0000	9.0000	7.2500	1.0000	1.0000	0.8750	1
24	20.0000	7.5000	5.7500	1.2500	1.2500	1.0000	1
25	22.0000	9.0000	7.2500	1.2500	1.2500	1.0000	1
26	23.0000	9.0000	7.2500	1.2500	1.2500	1.0000	1
27	20.0000	7.5000	5.7500	1.2500	1.2500	1.1250	1
28	23.0000	9.0000	7.2500	1.2500	1.2500	1.1250	1
29	21.0000	7.5000	5.7500	1.5000	1.5000	1.2500	1
30	23.0000	9.0000	7.2500	1.5000	1.5000	1.2500	1
31	24.0000	9.0000	7.2500	1.5000	1.5000	1.3750	1
32	24.0000	9.0000	7.2500	1.7500	1.7500	1.5000	1
33	24.0000	9.0000	7.2500	1.7500	1.7500	1.6250	1
34	25.0000	9.0000	7.2500	2.0000	2.0000	1.7500	1
35	25.0000	9.0000	7.2500	2.0000	2.0000	1.8750	2



Algorithm for Terminating I Beam Stanchion Cap Plate

A: $A = w_1 + 4"$

B: $B = d + 2(t_1 + .25")$

T: $T = t_1$

If $T < .5"$ _____ $T = .5"$

NOTE:

1. w_1 & t_1 are dimensions of I - Beam stanchion
   Optional .5" radius on each corner

SH 131441

FIGURE 17. Key diagram and algorithms for terminating I-beam stanchion cap plate.

TABLE XXII. Summary of standard I-beam stanchion cap plates.

I-BEAM STANCHION CAP PLT ID	DIMENSION A	DIMENSION B	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	
1	9.0000	6.0000	0.5000	1
2	10.0000	8.0000	0.5000	1
3	11.0000	8.0000	0.5000	2
4	12.0000	10.0000	0.5000	1
5	13.0000	10.0000	0.5000	1
6	13.0000	10.0000	0.6250	1
7	14.0000	12.0000	0.6250	1
8	15.0000	12.0000	0.6250	1
9	16.0000	14.0000	0.6250	1
10	13.0000	11.0000	0.7500	1
11	15.0000	13.0000	0.7500	1
12	17.0000	15.0000	0.7500	2
13	19.0000	16.0000	0.7500	1
14	13.0000	11.0000	0.8750	1
15	15.0000	13.0000	0.8750	2
16	17.0000	15.0000	0.8750	1
17	19.0000	17.0000	0.8750	2
18	13.0000	12.0000	1.0000	1
19	15.0000	14.0000	1.0000	1
20	17.0000	16.0000	1.0000	2
21	19.0000	17.0000	1.0000	1
22	15.0000	14.0000	1.1250	1
23	17.0000	16.0000	1.1250	1
24	19.0000	18.0000	1.1250	1
25	20.0000	18.0000	1.1250	1
26	15.0000	15.0000	1.2500	1
27	17.0000	17.0000	1.2500	1
28	20.0000	18.0000	1.2500	1
29	20.0000	19.0000	1.3750	1
30	17.0000	18.0000	1.5000	1
31	20.0000	19.0000	1.5000	1
32	17.0000	18.0000	1.6250	1
33	20.0000	20.0000	1.6250	1
34	17.0000	19.0000	1.7500	1
35	20.0000	20.0000	1.7500	1
36	17.0000	20.0000	2.0000	1

TABLE XXII. Summary of standard I-beam stanchion cap plates. - Continued

I-BEAM STANCHION CAP PLT ID	DIMENSION A	DIMENSION B	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	
37	20.0000	21.0000	2.0000	1
38	21.0000	22.0000	2.1250	1
39	21.0000	23.0000	2.3750	1
40	21.0000	23.0000	2.5000	1
41	21.0000	24.0000	2.7500	1
42	21.0000	25.0000	2.8750	1
43	21.0000	26.0000	3.1250	1

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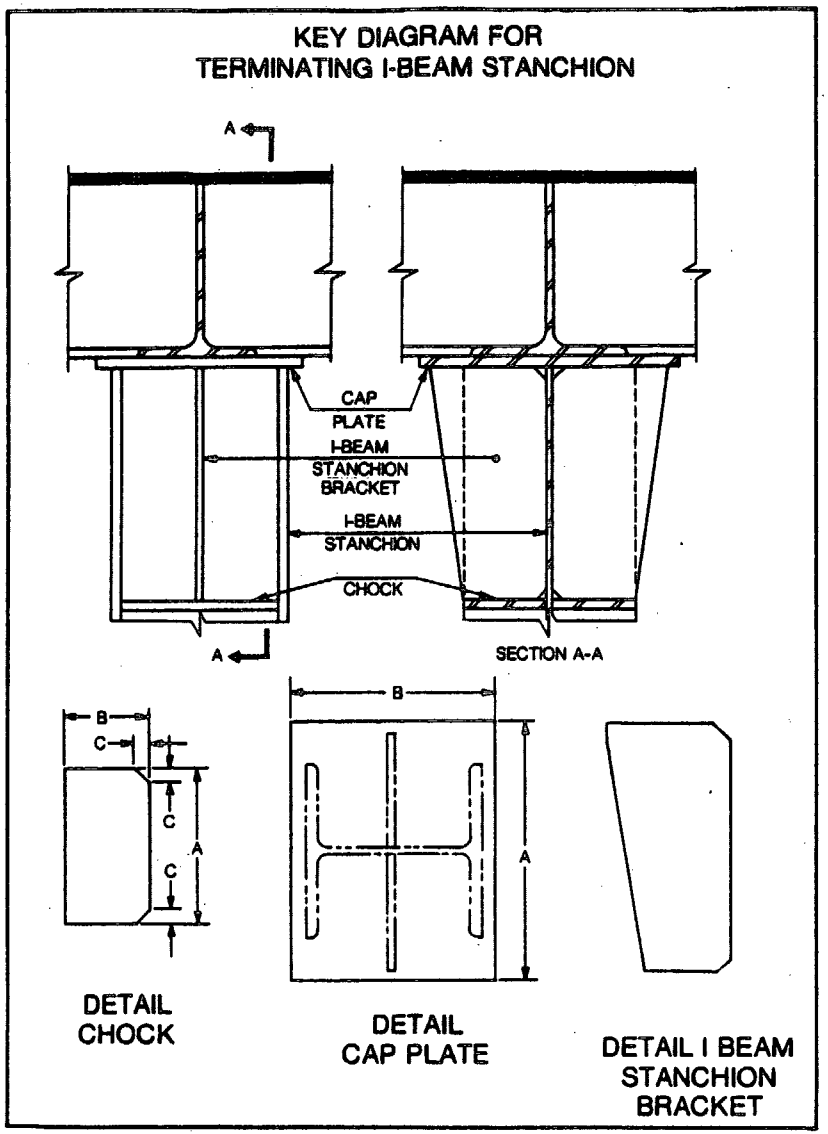

Algorithms for Terminating I Beam Stanchion Chock

* A: $A = d - 2t_f$

B: $B = .5(w_f - t_w)$

C: $C = k - t_f + .125"$

If $C > .5B$ _____ $C = .5B$

If $C < .5"$ and $B > 1.0"$ _____ $C = .5"$

T: $T = t_f$

If $T < .1875"$ _____ $T = .1875"$

NOTE:

1. d, w_f, t_w, k & t_w are dimensions of I - Beam stanchion
2. * indicates a neat fit dimension
3. Radius of $\frac{C}{2}$ is acceptable.

SH 131442

FIGURE 18. Key diagram and algorithms for terminating I-beam stanchion chock.

TABLE XXIII. Summary of standard I-beam stanchion bracket chocks.

I-BEAM STAN BKT CHOCK ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
1	3.2500	1.7500	0.5000	0.3750	1
2	5.2500	2.7500	0.5000	0.3750	1
3	5.2500	2.7500	0.7500	0.3750	1
4	5.2500	2.7500	0.5000	0.5000	1
5	7.0000	3.7500	0.7500	0.5000	1
6	7.0000	3.7500	0.7500	0.6250	1
7	8.7500	4.7500	1.0000	0.6250	1
8	10.7500	5.7500	1.0000	0.6250	1
9	7.0000	3.7500	0.7500	0.7500	1
10	8.7500	4.7500	1.0000	0.7500	1
11	10.7500	5.7500	1.0000	0.7500	1
12	12.5000	7.0000	1.0000	0.7500	1
13	7.0000	3.7500	0.7500	0.8750	1
14	8.7500	4.7500	0.7500	0.8750	1
15	8.7500	4.7500	1.0000	0.8750	1
16	10.7500	5.7500	1.0000	0.8750	1
17	12.5000	7.0000	1.0000	0.8750	1
18	7.0000	3.7500	0.7500	1.0000	1
19	8.7500	4.7500	1.0000	1.0000	1
20	10.7500	5.7500	1.0000	1.0000	1
21	12.5000	7.0000	1.0000	1.0000	1
22	8.7500	4.7500	1.0000	1.1250	1
23	10.7500	5.7500	1.0000	1.1250	1
24	12.5000	7.0000	1.0000	1.1250	1
25	12.5000	7.2500	1.0000	1.1250	1
26	8.7500	4.7500	0.7500	1.2500	1
27	10.7500	5.7500	1.0000	1.2500	1
28	12.5000	7.2500	1.0000	1.2500	1
29	12.5000	7.2500	1.0000	1.3750	1
30	10.7500	5.7500	1.0000	1.5000	1
31	12.5000	7.2500	1.0000	1.5000	1
32	10.7500	5.7500	1.0000	1.6250	1
33	12.5000	7.2500	1.0000	1.6250	1
34	10.7500	5.7500	1.0000	1.7500	1
35	12.5000	7.2500	1.0000	1.7500	1
36	10.7500	5.7500	1.0000	2.0000	1

TABLE XXIII. Summary of standard I-beam stanchion bracket chocks. - Continued

I-BEAM STAN BKT CHOCK ID	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	NUMBER OF APPLICATIONS
	IN	IN	IN	IN	
37	12.5000	7.2500	1.0000	2.0000	1
38	12.5000	7.2500	1.0000	2.1250	1
39	12.5000	7.2500	1.0000	2.3750	1
40	12.5000	7.2500	1.0000	2.5000	1
41	12.5000	7.2500	1.0000	2.7500	1
42	12.5000	7.2500	1.0000	2.8750	1
43	12.5000	7.2500	1.0000	3.1250	1

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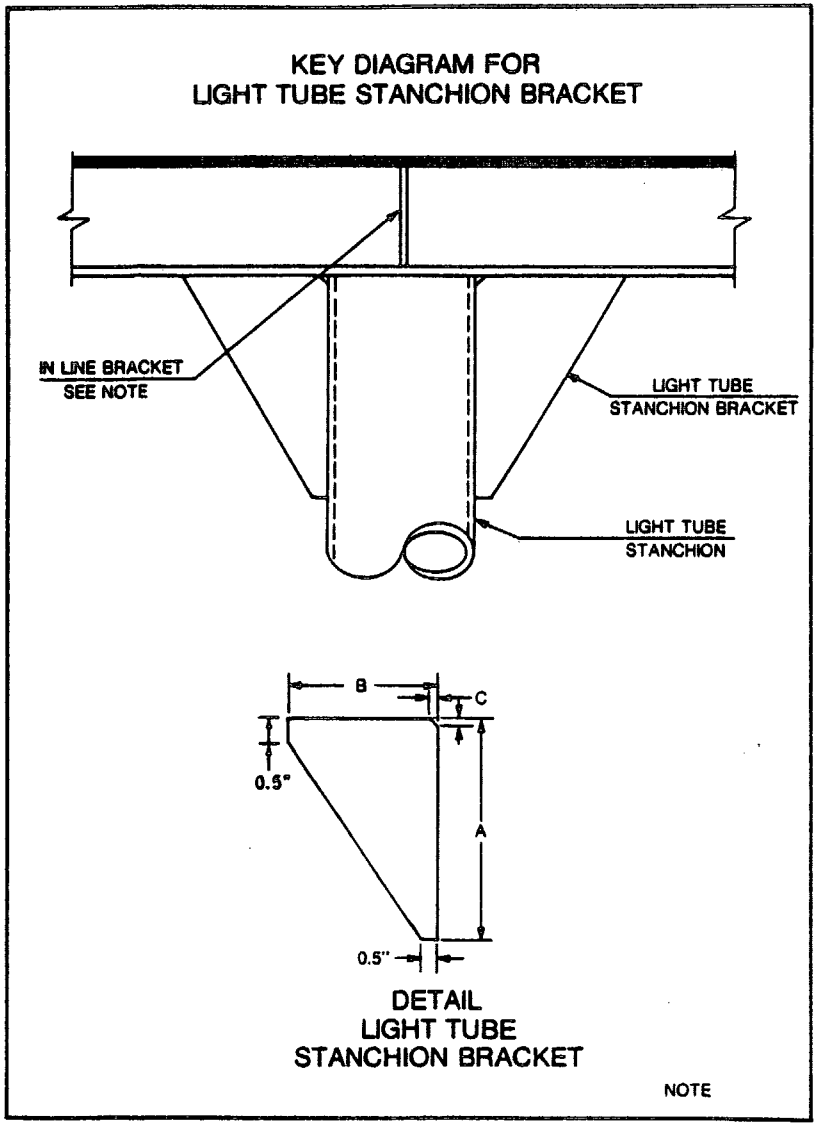


Algorithms for Light Tube Stanchion Bracket

A: $A = 1.5d_o$

B: $B = d_o$

C: $C = t_w$

If $C < .5"$ and

$B \geq 1.0"$ _____ $C = .5"$

If $C > .5B$ _____ $C = .5B$

T: $T = t_w$

If $T < .1875"$ $T = .1875"$

NOTE:

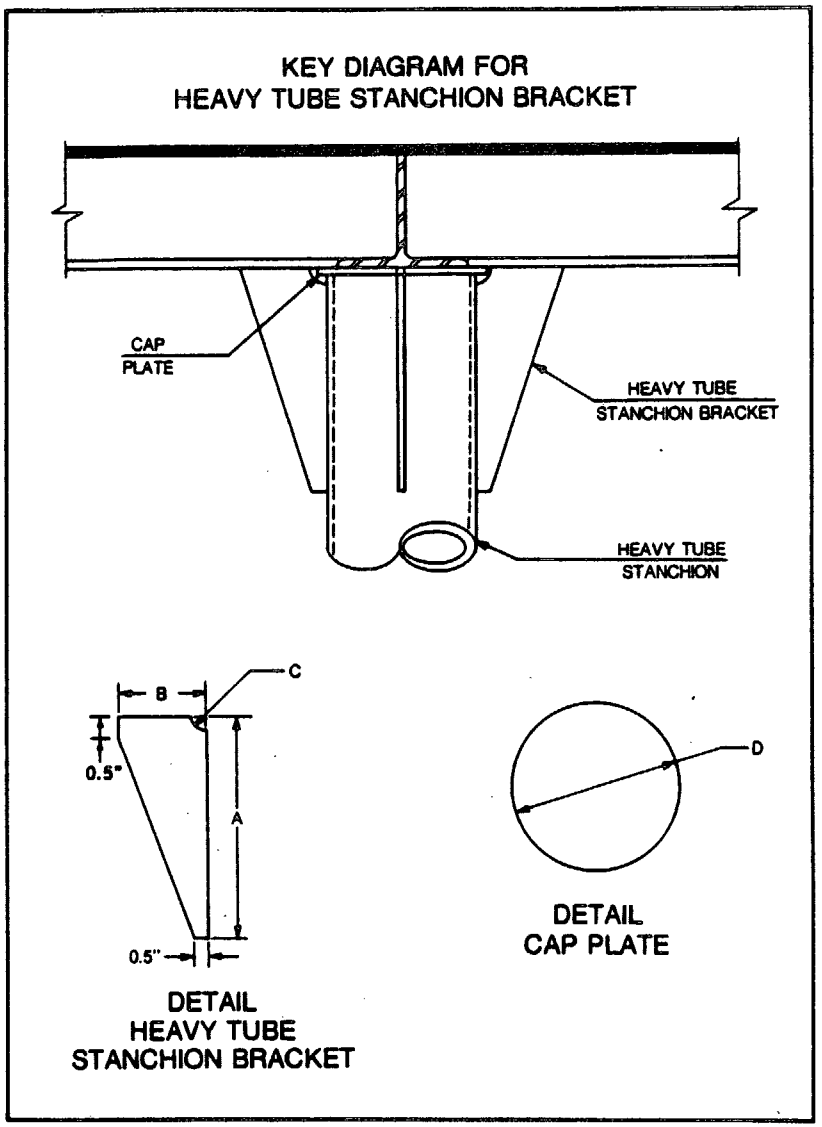
1. d_o and t_w are dimensions of tube stanchion
2. **Radius of $\frac{C}{2}$ is acceptable**

SH 12971

FIGURE 19. Key diagram and algorithms for light tube stanchion bracket.

TABLE XXIV. Light-tube stanchion bracket - typical dimensions.

MEMBER ID	NOMINAL DIAMETER	STRENGTH GRADE	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	LT STAN BRACKET ID
	IN		IN	IN	IN	IN	
1	3	STD	6.0000	3.5000	0.5000	0.2500	1
2	3 1/2	STD	6.0000	4.0000	0.5000	0.2500	2
3	4	STD	7.0000	4.5000	0.5000	0.2500	3
4	5	STD	9.0000	6.0000	0.5000	0.3750	7
5	6	STD	10.0000	7.0000	0.5000	0.3750	8
6	8	STD	13.0000	9.0000	0.5000	0.3750	9
7	10	STD	17.0000	11.0000	0.5000	0.3750	10
8	12	STD	20.0000	13.0000	0.5000	0.3750	11
9	3	XS	6.0000	3.5000	0.5000	0.3750	4
10	3 1/2	XS	6.0000	4.0000	0.5000	0.3750	5
11	4	XS	7.0000	4.5000	0.5000	0.3750	6
12	5	XS	9.0000	6.0000	0.5000	0.3750	7
13	6	XS	10.0000	7.0000	0.5000	0.5000	12
14	8	XS	13.0000	9.0000	0.5000	0.5000	13
15	10	XS	17.0000	11.0000	0.5000	0.5000	14
16	12	XS	20.0000	13.0000	0.5000	0.5000	15



Algorithms for Heavy Tube Stanchion Bracket

A: $A = 1.5d_o$

B: $B = .5d_o + 1"$

C: If $t_w > .75"$ _____ $C = t_{wall} + .25"$
If $t_w \leq .75"$ _____ $C = 1.0"$

$T = t_w$
If $T < .1875"$ _____ $T = .1875"$

NOTE:

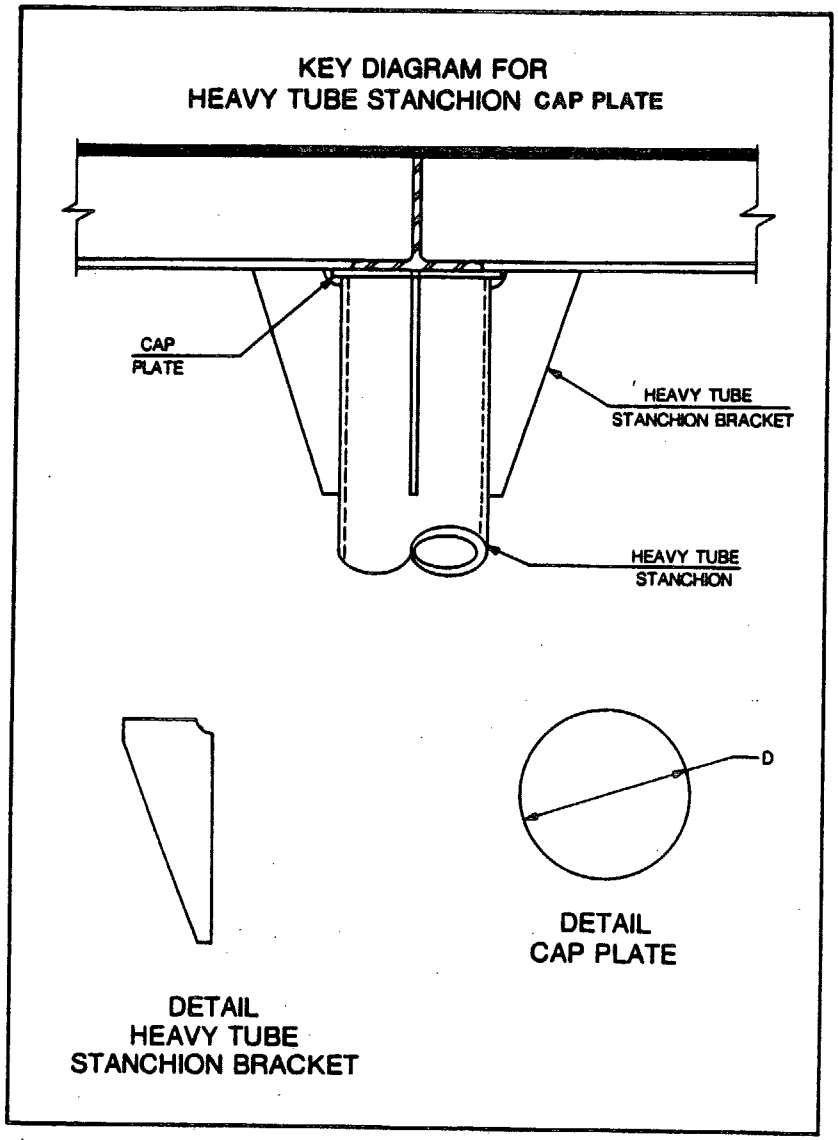
1. d_o and t_w are dimensions of tube stanchion
2. **Radius of $\frac{C}{2}$ is acceptable**

SH 12972

FIGURE 20. Key diagram and algorithms for heavy tube stanchion bracket.

TABLE XXV. Heavy-tube stanchion bracket - typical dimensions.

MEMBER ID	NOMINAL DIAMETER	STRENGTH GRADE	DIMENSION A	DIMENSION B	DIMENSION C	PLATE THICKNESS	HT STAN BRACKET ID
	IN		IN	IN	IN	IN	
9	3	XS	6.0000	3.0000	1.0000	0.3750	1
10	3 1/2	XS	6.0000	3.0000	1.0000	0.3750	1
11	4	XS	7.0000	3.5000	1.0000	0.3750	2
12	5	XS	9.0000	4.0000	1.0000	0.3750	3
13	6	XS	10.0000	4.5000	1.0000	0.5000	4
14	8	XS	13.0000	5.5000	1.0000	0.5000	5
15	10	XS	17.0000	6.5000	1.0000	0.5000	6
16	12	XS	20.0000	7.5000	1.0000	0.5000	7
17	3	XXS	6.0000	3.0000	1.0000	0.6250	8
18	4	XXS	7.0000	3.5000	1.0000	0.7500	9
19	5	XXS	9.0000	4.0000	1.0000	0.7500	10
20	6	XXS	10.0000	4.5000	1.2500	0.8750	11
21	8	XXS	13.0000	5.5000	1.2500	0.8750	12



Algorithms for Heavy Tube Stanchion Cap Plate

D: $D = d_o + 2t_w + .5"$

T: $T = t_w$

If $T < .5"$ _____ $T = .5"$

NOTE:

1. d_o and t_w are dimensions of tube stanchion
2. **Radius of $\frac{C_1}{2}$ is acceptable**

SH 131443

FIGURE 21. Key diagram and algorithms for heavy tube stanchion bracket - cap plate.

TABLE XXVI. Stanchion cap plate - typical dimensions.

MEMBER ID	NOMINAL DIAMETER	STRENGTH GRADE	DIMENSION A	PLATE THICKNESS	HT STAN SOLE/CAP PLATE ID
	IN		IN	IN	
9	3	XS	5.0000	0.5000	1
10	3 1/2	XS	6.0000	0.5000	2
11	4	XS	6.0000	0.5000	2
12	5	XS	7.0000	0.5000	3
13	6	XS	8.0000	0.5000	4
14	8	XS	11.0000	0.5000	5
15	10	XS	13.0000	0.5000	6
16	12	XS	15.0000	0.5000	7
17	3	XXS	6.0000	0.6250	8
18	4	XXS	7.0000	0.7500	9
19	5	XXS	8.0000	0.7500	10
20	6	XXS	9.0000	0.8750	11
21	8	XXS	11.0000	0.8750	12

DEPTH OF BHD STIFFENER			BRACKET CONSTRUCTION		l/d RATIO		FIGURE NUMBER	NOTES
d < 6"	6"≤d≤10"	d > 10"	ROLLED SHAPE	BUILT UP FROM PLATE	$\frac{l}{d}$<26	$\frac{l}{d}$>22		
●			●		●		23	Note 3
●			●			●	24	Note 4
●				●	●	●	25	Note 4
	●		●		●		26	Note 3
	●		●			●	27	Note 4
	●		●			●	28	Note 4
	●			●	●	●	29	Note 4
		●	●		●		30	Note 3
		●	●			●	31	Note 4
		●		●	●	●	32	Note 4

1. l/d RATIO is the ratio of length to depth of longitudinal
2. Overlap of l/d RATIO is intentional
3. Flange snipes are not used on primary structure.
4. This detail is not used for primary structure.

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FIGURE 22. Applicability index for intersections of longitudinal and bulkhead stiffener.

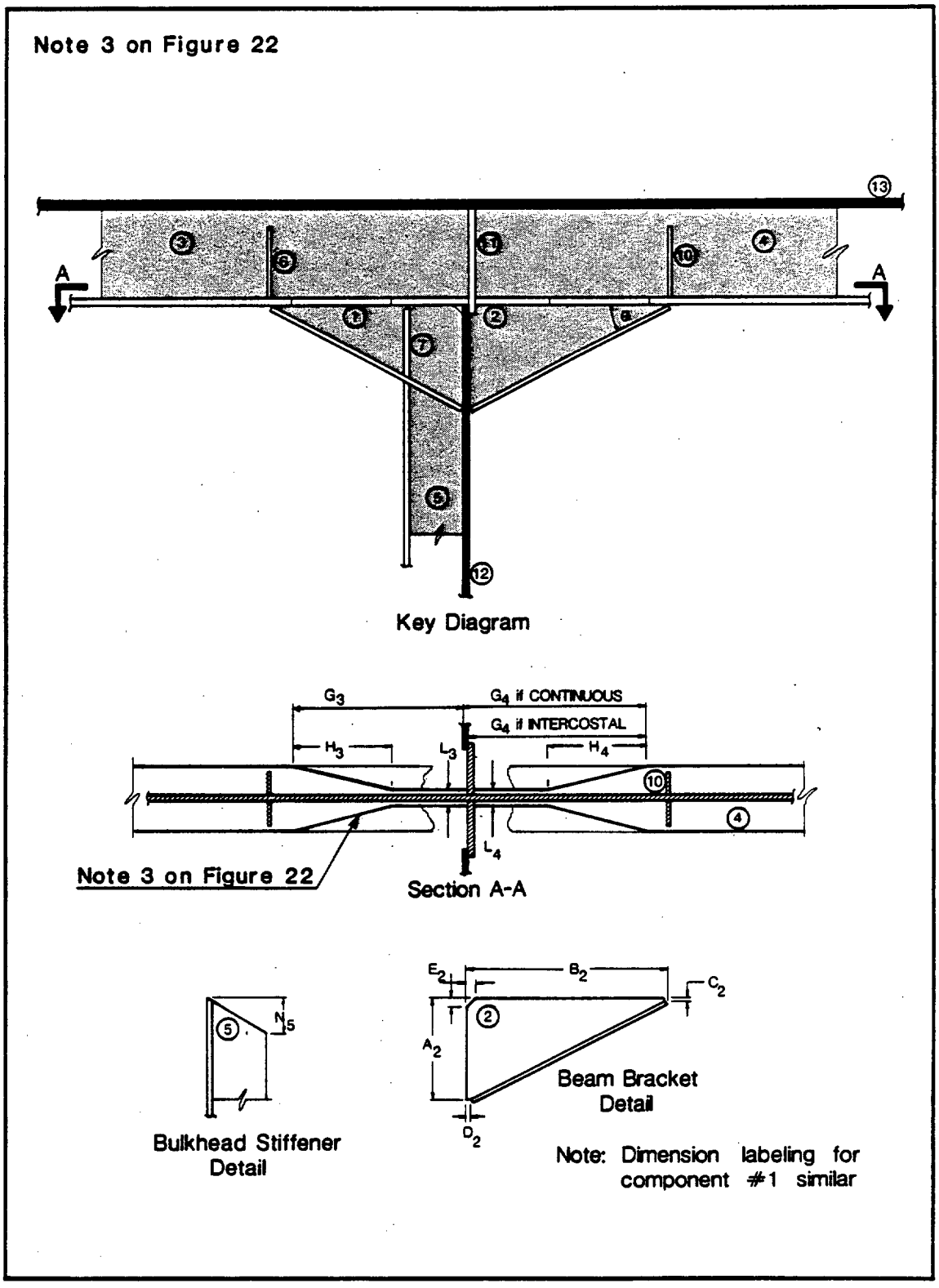

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FIGURE 23. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth < 6", bracket cut from rolled shape, 1/d < 26.

Component #1		Beam Bracket (Stiffener Side)	
	A_1	If $d_3<6"$ or $d_3>20"$	$A_1=d_3-t_{f3}$
		If $6"\leq d_3\leq 20"$	$A_1=d_3-t_{f3}+1"$
	B_1	If $2d_3>.125\ \ell_3$	$B_1=2d_3$
		If $2d_3\leq .125\ \ell_3$	$B_1=.125\ \ell_3$
	C_1	Always	$.125"\leq C_1\leq .25"$
	D_1	Always	$.125"\leq D_1\leq .25"$
	E_1	If $t_{f3}>t_{12}$ and $t_{12}>.5"$	$E_1=t_{12}$
		If $t_{f3}\leq t_{12}$ and $t_{f3}>.5"$	$E_1=t_{f3}$
		If $t_{f3}<.5"$ and $t_{12}>.5"$	$E_1=.5"$
	Θ_1	Always	$\Theta_1=\tan^{-1}[(A_1-C_1)/(B_1-D_1)]$
		If $\Theta_1<20°$	Refer to Figure 24 for ① ③ and ⑤.
	A_1'	Always	$A_1'=(A_1-E_1+(D_1+t_{f3}/\sin\Theta_1)\tan\Theta_1)\cos\Theta_1$
			$B_1'=(B-E_1+(C_1+t_{f3}/\cos\Theta_1)/\tan\Theta_1)\sin\Theta_1$
		If $A_1'\leq d_3$ and $B'\leq d_3$	Cut bracket from section of ③.
		If $A_1'>d_3$ or $B'<d_3$	Bracket cannot be cut from section of longitudinal. Use Figure 25 or cut bracket from section with equivalent t_w, t_f and w_f and $d\geq A_1'$ and $d\geq B_1'$ or fabricate bracket.
Component #2		Beam Bracket (Opposite Side)	
	A_2	If $d_4<6"$ or $d_4>20"$	$A_2=d_4-t_{f4}$
		If $6"\leq d_4\leq 20"$	$A_2=d_4-t_{f4}+1"$
	B_2	If $2d_4>.125\ \ell_4$	$B_2=2d_4$
		If $2d_4\leq .125\ \ell_4$	$B_2=.125\ \ell_4$
	C_2	Always	$.125"\leq C_2\leq .25"$
	D_2	Always	$.125"\leq D_2\leq .25"$
	E_2	If $t_{f4}>t_{12}$ and $t_b>.5"$	$E_2=t_{12}$
		If $t_{f4}\leq t_{12}$ and $t_{f4}>.5"$	$E_2=t_{f4}$
		If $t_{f4}<.5$ or $t_{12}<.5"$	$E_2=.5"$
	A_2	Always	$\Theta_2=\tan^{-1}[(A_2-C_2)/(B_2-D_2)]$
		If $\Theta_2<20°$	Refer to Figure 24
	A_2'	Always	$A_2'=(A_2-E_2+(D_2+t_{f4}/\sin\Theta_2)\tan\Theta_2)\cos\Theta_2$
			$B_2'=(B_2-E_2+(C_2+t_{f4}/\cos\Theta_2)/\tan\Theta_2)\sin\Theta_2$
		If $A_2'\leq d_4$ and $B_2'\leq d_4$	Cut bracket from section of ④.
		If $A_2'>d_4$ or $B_2'>d_4$	Bracket cannot be cut from section of ④. Use Figure 25 or cut bracket from section with equivalent t_w, t_f and w_f and $d\geq A_1'$ and $d\geq B_1'$ or fabricate bracket.
Component #3		Longitudinal Beam (Stiffener Side)	
Optional	G_3	If $B_1-1.5>1.5\ w_{f3}$	$1.5\ w_{f3}\leq G_3\leq B_1-1.5"$
		If $B_1-1.5\leq 1.5\ w_{f3}$	$G_3=B_1-1.5"$
Optional	H_3	If $B_1-1.5>1.5\ w_{f3}$	$H_3=1.5\ w_{f3}$
		If $B_1-1.5\leq 1.5\ w_{f3}$	$H_3=B_1-1.5"$
Optional	L_3	Always	$L_3=3t_{w3}+.25"$

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FIGURE 23. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth < 6", bracket cut from rolled shape, 1/d < 26. - Continued

Component #4	Longitudinal Beam (Opposite Side)	
Optional G_4	If longitudinal is continuous and: $B_2-1.5" > 1.5\ w_{f4}$ $B_2-1.5" \leq 1.5\ w_{f4}$ If longitudinal is intercostal and: $B_2-1.5" > 1.5\ w_{f4}$ $B_2-1.5" \leq 1.5\ w_{f4}$	 $1.5\ w_{f4}+t_b < G_4 < B_2-1.5"-t_b$ $G_4=B_2-1.5"+t_b$ $1.5\ w_{f4} < G_4 < B_4-1.5"$ $G_4=B_2-1.5"$
Optional H_4	If $B_2-1.5" > 1.5\ w_{f4}$ If $B_2-1.5" \leq 1.5\ w_{f4}$	$H_4=1.5\ w_{f4}$ $H_4=B_2-1.5"$
Optional L_4	Always	$L_4=3t_{w4}+.25"$
Component #5	Bulkhead Stiffener	
N_5	Always	$N_5=d_5(\lvert(A_1-C_1)/(B_1-D_1)\rvert)$
Component #6	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7	Toe Bracket	
		Select toe bracket from Table 6. Member to be bracketed = ⑤. Thickness of backing structure = t_{w3}. Read corresponding dimension from Table 7.
	If $a_7 > A_1-d_5(\lvert(A_1-C_1)/(B_1-D_1)\rvert)-t_{w3}$ or $b_7 > .5(w_{f3}-t_{w3})-.25"$ or $c_7 < k_3-t_{f3}$	Redesign toe bracket to suit application.
Component #8	Toe Bracket	
		Not required
Component #9	In-line Bracket	
		Not required
Component #10	Tangency Bracket	
	Always	Select tangency bracket from Table 5: Member to be bracketed = ④.
Component #11	Collar	
	If longitudinal is intercostal	Not required
	If longitudinal is continuous and:	
	watertight and flange not cut back	Select flush or lapped collar from Table 13.
	not watertight and flange not cut back	Select lug collar from Table 12.
	flange cut back	Redesign collar to suit application.
Component #12	Bulkhead	
	If longitudinal is intercostal	Not required
	If longitudinal is continuous and:	
	flange not cut back	$Q_{12}=d_3+.125"$ $R_{12}=w_{f3}+1.5"$
	flange cut back	$Q_{12}=d_3+.125"$ $R_{12}=3t_{w3}+1.75$

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FIGURE 23. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth < 6", bracket cut from rolled shape, 1/d < 26. - Continued

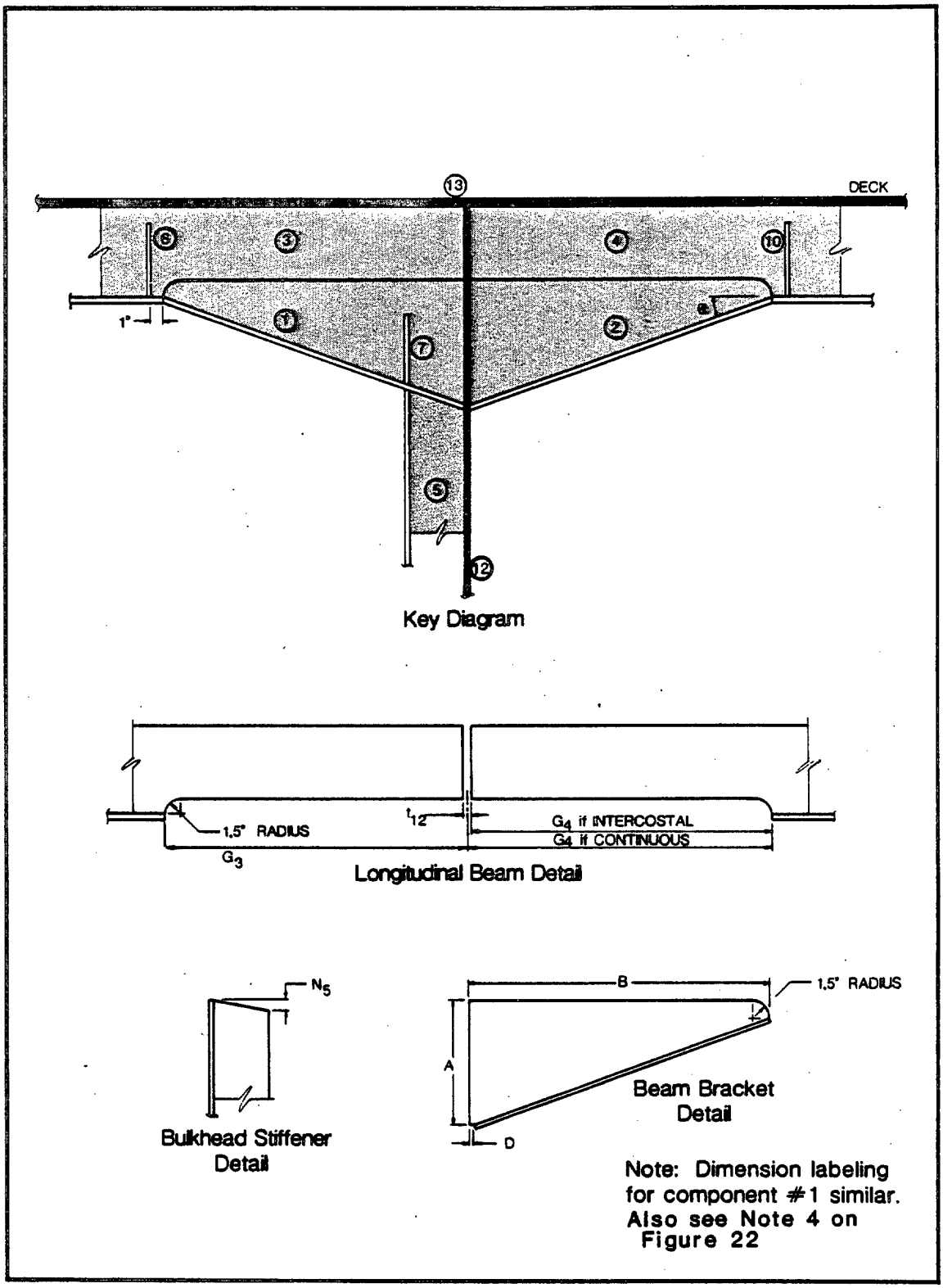

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FIGURE 24. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth < 6", bracket cut from rolled shape, 1/d > 22.

Component #1	Beam Bracket (Stiffener Side)	
A_1	If $d_3<6"$ or $d_3>20"$	$A_1=d_3+1.5"$
	If $6"<d_3<20"$	$A_1=d_3+2.5"$
B_1	If $2d_3>.125\ \ell_3$	$B_1=2d_3$
	If $2d_3\leq.125\ \ell_3$	$B_1=.125\ \ell_3$
D_1	Always	$.125"\leq D_1\leq.25"$
Θ_1	Always	$\Theta_1=\tan^{-1}[(A_1-1.5")/(B_1-D_1)]$
	If $\Theta_1>20°$	Refer to Figure 23 for ① ③ ⑤ and ⑦.
A_1'	Always	$A_1'=(A_1+(D_1+t_{f3}/\sin\Theta_1)\tan\Theta_1)\cos\Theta_1$
	If $A_1'\leq d_3$	Cut bracket from section of ③.
	If $A_1'>d_3$	Bracket cannot be cut from section of ③. Use Figure 25 or cut bracket from section with equivalent t_w, t_f and w_f and $d\geq A_1'$ or fabricate bracket.
Component #2	Beam Bracket (Opposite Side)	
A_2	If $d_4<6"$ or $d_4>20"$	$A_2=d_4+1.5"$
	If $6"\leq d_4\leq20"$	$A_2=d_4+2.5"$
B_2	If $2d_4>.125\ \ell_4$	$B_2=2d_4$
	If $2d_4\leq.125\ \ell_4$	$B_2=.125\ \ell_4$
D_2	Always	$.125"\leq D_2\leq.25"$
Θ_2	Always	$\Theta_2=\tan^{-1}[(A_2-1.5")/(B_2-D_2)]$
	If $\Theta_2>20°$	Refer to Figure 23 for ② and ④.
A_2'	Always	$A_2'=(A_2+(D_2+t_{f4}/\sin\Theta_2)\tan\Theta_2)\cos\Theta_2$
	If $A_2'\leq d_4$	Cut bracket from section of ④.
	If $A_2'>d_4$	Bracket cannot be cut from section of ④. Use Figure 25 or cut bracket from section with equivalent t_w, t_f and w_f and $d\geq A_1'$ or fabricate bracket.
Component #3	Longitudinal (Stiffener Side)	
G_3	Always	$G_3=B_1$
Component #4	Longitudinal (Opposite Side)	
G_4	If longitudinal is continuous	$G_4=B_2+t_b$
	If longitudinal is intercostal	$G_4=B_2$
Component #5	Bulkhead Stiffener	
N_5	Always	$N_5=d_5[(A_1-1.5")/(B_1-D_1)]$
Component #6	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7	Toe Bracket	
	Always	Select toe bracket from Table 6. Member to be bracketed = ⑤. Thickness of backing structure = t_{w3}. Read corresponding dimension from Table 7.
	If $a_7>A_1+d_3-1.5"-t_{w3}-N_5$ or $b_7>.5(w_{f3}-t_{w3})-.25"$ or $c_7<k_3-t_{f3}$	Redesign toe bracket to suit application.

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FIGURE 24. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth < 6", bracket cut from rolled shape, l/d > 22. - Continued

Component #8	Toe Bracket	
		Not required
Component #9	In-line Bracket	
		Not required
Component #10	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ④.
Component #11	Collar	
		Not required
Component #12	Bulkhead	
	If longitudinal is intercostal If longitudinal is continuous	No detail required $Q_{12}=d_3-1.375"$ $R_{12}=t_{w3}+.25"$

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FIGURE 24. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth < 6", bracket cut from rolled shape, 1/d > 22. - Continued

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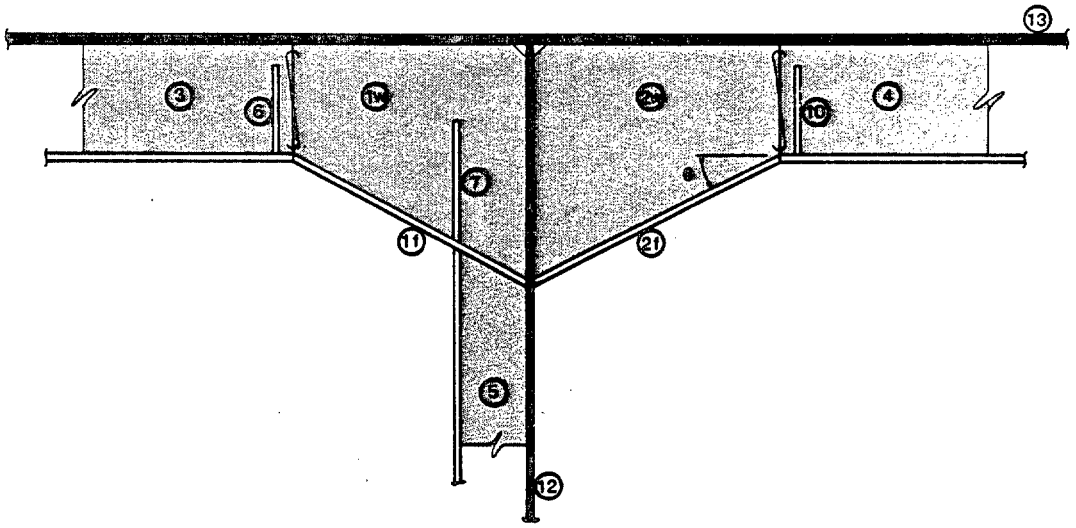
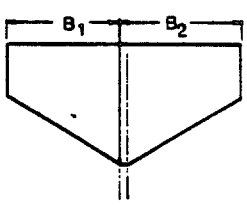
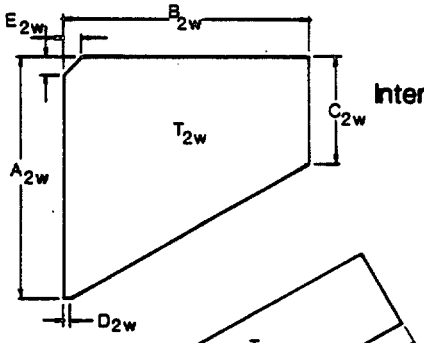
Note 4 on Figure 22



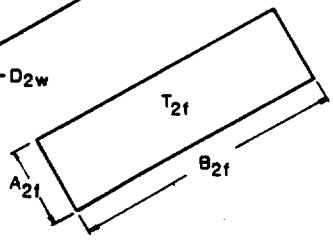
Key Diagram

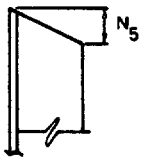


Continuous Bracket Detail



Intercostal Bracket Detail





Bulkhead Stiffener Detail

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FIGURE 25. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth < 6", built-up, all l/d.

Component #1a	Beam Bracket Web (Stiffener Side)	
A_{1a}	If $d_3<6"$ or $d_3>20"$	$A_{1a}=2d_3-t_{f3}$
	If $6"\leq d_3\leq 20"$	$A_{1a}=2d_3-t_{f3}+1"$
B_{1a}	If $2d_3>.125\ \ell_3$	$B_{1a}=2d_3$
	If $2d_3\leq .125\ \ell_3$	$B_{1a}=.125\ \ell_3$
C_{1a}	Always	$C_{1a}=d_3-t_{f3}$
D_{1a}	Always	$.125"\leq D_{1a}\leq .25"$
E_{1a}	If bracket is continuous	$E_{1a}=0$
	If bracket is intercostal and:	
	$t_{13}>t_{12}$ and $t_{12}>.5"$	$E_{1a}=t_{12}$
	$t_{13}\leq t_{12}$ and $t_{12}>.5"$	$E_{1a}=t_{13}$
	$t_{13}\leq .5"$ or $t_{12}\leq .5"$	$E_{1a}=.5"$
T_{1a}	Always	$T_{1a}=t_{w3}$
Component #1b	Beam Bracket Flange (Stiffener Side)	
A_{1b}	Always	$A_{1b}=((A_{1a}-C_{1a})^2+(B_{1a}-D_{1a})^2)^{1/2}$
B_{1b}	Always	$B_{1b}=w_{f3}$
T_{1b}	Always	$T_{1b}=t_{f3}$
Component #2a	Beam Bracket Web (Opposite Side	
A_{2a}	If $d_4<6"$ or $d_4>20"$	$A_{2a}=2d_4-t_{f3}$
	If $6"\leq d_4\leq 20"$	$A_{2a}=2d_4-t_{f3}+1"$
B_{2a}	If bracket is intercostal and:	
	$2d_4>.125\ \ell_4$	$B_{2a}=2d_4$
	$2d_4\leq .125\ \ell_4$	$B_{2a}=.125\ \ell_4$
	If bracket is continuous and:	
	$2d_4>.125\ \ell_4$	$B_{2a}=2d_4+t_b$
	$2d_4\leq .125\ \ell_4$	$B_{2a}=.125\ \ell_4-t_b$
C_{2a}	Always	$C_{2a}=d_4-t_{f4}$
D_{2a}	If bracket is continuous	$.125"+t_b\leq D_{2a}\leq .25"+t_b$
	If bracket is intercostal	$.125"\leq D_{2a}\leq .25"$
E_{2a}	If bracket is continuous	$E_{2a}=0$
	If bracket is intercostal and:	
	$t_{13}>t_{12}$ and $t_{12}>.5"$	$E_{2a}=t_{12}$
	$t_{13}\leq t_{12}$ and $t_{13}>.5"$	$E_{2a}=t_{13}$
	$t_{13}\leq .5"$ or $t_{12}\leq .5"$	$E_{2a}=.5"$
T_{2a}	Always	$T_{2a}=t_{w4}$
Component #2b	Beam Bracket Flange (Opposite Side)	
A_{2b}	Always	$A_{2b}=((A_{2a}-C_{2a})^2+(B_{2a}-D_{2a})^2)^{1/2}$
B_{2b}	Always	$B_{2b}=w_{f4}$
T_{2b}	Always	$T_{2b}=t_{f4}$
Component #3	Longitudinal Beam (Stiffener Side)	
		No detail required
Component #4	Longitudinal Beam (Opposite Side)	
		No detail required

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FIGURE 25. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth < 6", built-up, all l/d. - Continued

Component #5	Bulkhead Stiffener	
N_5	Always	$N_5=d_5[(A_{1a}-C_{1a})/(B_{1a}-D_{1a})]$
Component #6	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7	Toe Bracket	
	Always	Select toe bracket from Table 6. Member to be bracketed = ⑤. Thickness of backing structure = T_{1a} Read corresponding dimensions from Table 7.
	If $a_7 \geq A_{1a}-d_5[(A_{1a}-C_{1a})/(B_{1a}-D_{1a})]$ or $b_7 \geq .5(B_{1b}-T_{1a})$ or $c_7 \leq T_{1a}$	Redesign toe bracket to suit application.
Component #8	Toe Bracket	
		Not required
Component #9	In-line Bracket	
		Not required
Component #10	Tangency Bracket	
	Always	Select tangency bracket from Table 6. Member to be bracketed = ④.
Component #11	Collar	
		Not required
Component #12	Bulkhead	
	If bracket is intercostal If bracket is continuous	No detail required $Q_{12}=A_{1a}+.125"$ $R_{12}=T_{1a}+.25"$

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FIGURE 25. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth < 6", built-up, all l/d. - Continued

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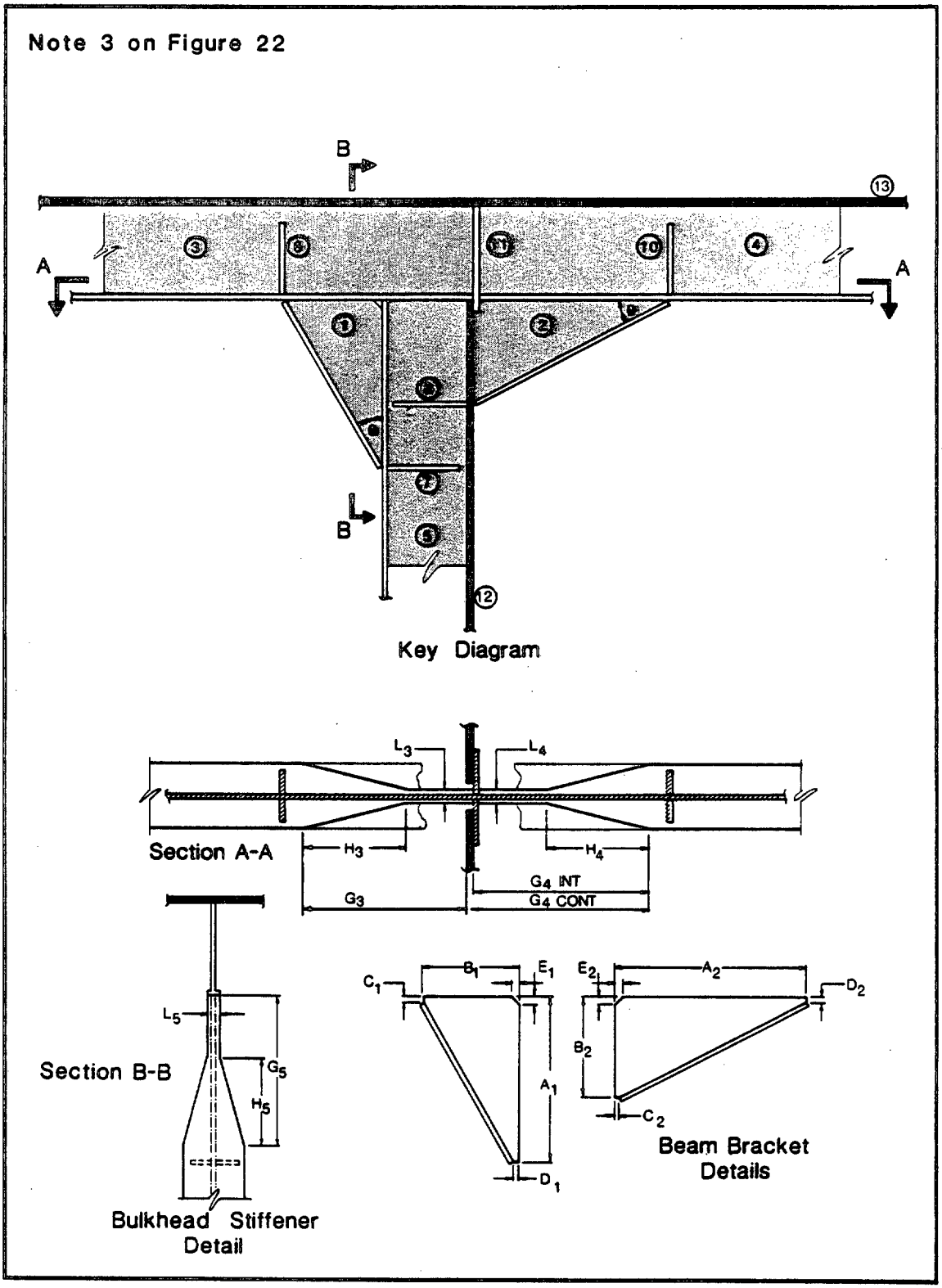

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FIGURE 26. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", bracket cut from rolled shape, l/d < 26.

Component #1	Beam Bracket on Stiffener Side of Bulkhead	
Determine bkt member	If $t_{f3} < t_{f5}$	$t_{f1} = t_{f5}$ $w_{f1} = w_{f5}$ $t_{w1} = t_{w5}$
	If $t_{f5} \leq t_{f3}$	$t_{f1} = t_{f3}$ $w_{f1} = w_{f3}$ $t_{w1} = t_{w3}$
Calculate dimension A_1	If $2d_5 \leq .125\ \ell_5$	$A_1 = .125\ \ell_5 - t_{f1}$
	If $2d_5 \geq .125\ \ell_5$	$A_1 = 2d_5 - t_{f1}$
	If $A_1 + d_3 < A_2 + d_4$ and $A_2 + d_4 - A_1 - d_3 < 3"$	$A_1 = A_2 + d_4 - d_3$
Calculate dimension B_1	If $2d_3 > .125\ \ell_3$ and $2d_3 > 2d_5 + 1$	$B_1 = 2d_3 - d_5$
	If $2d_5 + 1 > 2d_3$ and $2d_5 + 1 > .125\ \ell_3$	$B_1 = d_5 + 1$
	If $.125\ \ell_3 > 2d_3$ and $.125\ \ell_3 > 2d_5 + 1$	$B_1 = .125\ \ell_3$
Select dimension C_1	Always	$.125 < C_1 < .25$
Select dimension D_1	Always	$.125 < D_1 < .25$
Calculate bkt angle	Always	$\theta_1 = \tan^{-1}(A_1 - C_1)/(B_1 - D_1)$
Check angle range	If $\theta_1 > 70°$	Refer to Figure 27
	If $\theta_1 < 20°$	Refer to Figure 28
Calculate dimension E_1	If $t_{f3} > t_{f5}$ and $t_{f5} > .5$	$E_1 = t_{f5}$
	If $t_{f3} < t_{f5}$ and $t_{f3} > .5$	$E_1 = t_{f3}$
	If $t_{f3} < .5$ or $t_{f5} < .5$	$E_1 = .5$
Check depth of bkt against d_1 or d_5	Always	$A_1' = (A_1 - E_1 + (D_1 + (t_{f1}/\sin\theta_1))\tan\theta_1)\cos\theta_1$
	Always	$B_1' = (B_1 - E_1 + (C_1 + t_{f1}/\sin\theta_1))/(\tan\theta_1))\cos\theta_1$
	If $t_{f1} = t_{f5}$ and: $B_1' \leq d_5$ and $A_1' \leq d_5$	Cut bkt from section of bulkhead stiffener.
	$B_1' > d_5$ or $A_1' > d_5$	Bracket cannot be cut from section of bulkhead stiffener. Use Figure 29 or cut bkt from section with equivalent t_w, t_f and w_f and $d \geq A_1'$ or B_1', whichever is greater.
	If $t_{f1} = t_{f3}$ and: $B_1' < d_3$ and $A_1' < d_3$	Cut bkt from section of longitudinal.
	$B_1' > d_3$ or $A_1' > d_3$	Bracket cannot be cut from section of longitudinal. Use Figure 29 or cut bkt from section with equivalent t_w, t_f and w_f and $d \geq A_1'$ or B_1', whichever is greater.
Component #2	Beam Bracket on Opposite Side of Bulkhead	
Calculate dimension A_2	If $d_4 < 6"$ or $d_4 > 20"$	$A_2 = d_4 - t_{f4}$
	If $6" < d_4 < 20"$	$A_2 = d_4 - t_{f4} + 1"$
	If $A_2 + d_4 < A_1 + d_3$ and $A_1 + d_3 - A_2 - d_4 < 3"$	$A_2 = A_1 + d_3 - d_4$
Calculate dimension B_2	If $2d_4 > .125\ \ell_4$	$B_2 = 2d_4$
	If $2d_4 < .125\ \ell_4$	$B_2 = .125\ \ell_4$
Select dimension C_2	Always	$.125" < C_2 < .25"$
Calculate dimension D_2	Always	$.125" < D_2 < .25"$
Calculate bkt angle	Always	$\theta_2 = \tan^{-1}(A_2 - C_2)/(B_2 - D_2)$
Check angle range	If $\theta_2 < 20°$	Refer to Figure 27
Calculate dimension E_2	If $t_{f4} > t_b$ and $t_b > .5$	$E_2 = t_b$
	If $t_{f4} < t_b$ and $t_{f4} > .5$	$E_2 = t_{f4}$
	If $t_{f4} < .5$ or $t_b < .5$	$E_2 = .5$

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FIGURE 26. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", bracket cut from rolled shape, 1/d < 26. - Continued

Component #2 (contd)	Beam Bracket on Opposite Side of Bulkhead	
Check depth of bkt against d_4	Always Always If $A_2' < d_4$ and $B_2' < d_4$ If $A_2' > d_4$ or $B_2' > d_4$	$A_2' = (A_2 - E_2 + (D_2 + t_{f4}/\sin\Theta_2)\tan\Theta_2)\cos\Theta_2$ $B_2' = (B_2 - E_2 + (C_2 + t_{f4}/\sin\Theta_2)/\tan\Theta_2)\cos\Theta_2$ Cut bkt from section of longitudinal Bracket cannot be cut from section of longitudinal. Use Figure 29 or cut bkt from section with equivalent t_w, t_f and w_f and $d > A_2'$ and $d > B_2'$.
Component #3	Longitudinal Beam (Stiffener Side)	
Optional cut back of flange	If longitudinal is continuous If longitudinal is intercostal Always Always	$G_3 = B_1 + d_5 - 1.5"$ $G_3 = B_1 + d_5 - 1.5"$ $H_3 = 1.5\ w_{f3}$ $L_3 = 3t_{w3} + .25"$
Component #4	Longitudinal Beam (Opposite Side)	
Optional cut back of flange	If longitudinal is continuous If longitudinal is intercostal Always Always	$G_4 = B_2 - 1.5" + t_b$ $G_4 = B_2 - 1.5"$ $H_4 = 1.5\ w_{f4}$ $L_4 = 3t_{w4} + .25"$
Component #5	Bulkhead Stiffener	
Optional cut back of flange	Always Always Always	$G_5 = A_1 - 1.5"$ $H_5 = 1.5\ w_{f5}$ $L_5 = 3t_{w5} + .25"$
Component #6	Toe/Tangency Bracket	
Select tangency bkt	If $\Theta_1 < 45°$	Select appropriate tangency bkt from Table 5 (member = ③).
Select toe bracket	If $\Theta_1 \geq 45°$	Select appropriate toe bracket from Table 6. Member to be bracketed = ⑤. Thickness of backing structure = t_{w3}. Read corresponding dimensions from Table 7.
Check toe bracket clearance	If $\Theta_1 \geq 45°$ and $a > d_3 - t_{f3} - t_{w5}$ or $b > .5(w_{f3} - t_{w3})$ or $c > k_3 - t_{f3}$	Redesign toe bracket to suit application.
Component #7	Toe/Tangency Bracket	
Check requirement	If $A_1 = A_2$	Refer to component ⑨.
Select tangency bkt	If $A_1 \neq A_2$ and $\Theta_1 > 45°$	Select appropriate tangency bkt from Table 5. Member to be bracketed = ⑤.
Select toe bracket	If $A_1 \neq A_2$ and $\Theta_1 < 45°$	Select toe bracket from Table 6. Member to be bracketed = ③. Thickness of backing structure = t_{w5}. Read corresponding dimensions from Table 7.
Check toe bracket clearance	If $A_1 \neq A_2$ and $\Theta_1 < 45°$ and $a > d_5 - t_{f5} - t_{w5}$ or $b > .5(w_{f5} - t_{w5})$ or $c < k_5 - t_{f5}$	Redesign toe bracket to suit application.

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FIGURE 26. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", bracket cut from rolled shape, l/d < 26. - Continued

Component #8	Toe Bracket	
Check requirement Select toe bracket	If $A_1=A_2$ If $A_1\neq A_2$	Refer to component ⑨. Select toe bracket from Table 6. Member to be bracketed = ④. Thickness of backing structure - t_{w5}. Read corresponding dimensions from Table 7.
Check toe bracket clearance	If $A_1\neq A_2$ and $a>d_5-k_5$ or $c<t_{w5}$	Redesign toe bracket to suit application.
Component #9	In-line Bracket	
Check requirement Select in-line bkt	If $A_1\neq A_2$ If $A_1=A_2$	Refer to components ⑦ and ⑧. Select in-line bracket from Table 8. Backing structure = ⑤. Thickness of supported flange = t_{f1}.
Component #10	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ④.
Component #11	Collar	
Check requirement Select collar	If longitudinal is intercostal If longitudinal is continuous and $L_3\neq 0$ $L_3=0$ and: Bulkhead is watertight Bulkhead is not watertight	No collar required Redesign collar to suit cut back flange. Select lapped collar or flush collar from Tables 11 or 12. Piercing member = ③. Select lug collar from Table 10. Piercing member = ③.
Component #12	Bulkhead	
Check requirement	If longitudinal is intercostal If longitudinal is continuous and: $L_3=0$ $L_3\neq 0$	No collar required $Q_{12}=d_3+.125"$ $R_{12}=w_{f3}+1.5"$ $Q_{12}=d_3+.125"$ $R_{12}=L_4+1.5"$
Component #13	Deck	
		No detail required

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FIGURE 26. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", bracket cut from rolled shape, 1/d < 26. - Continued

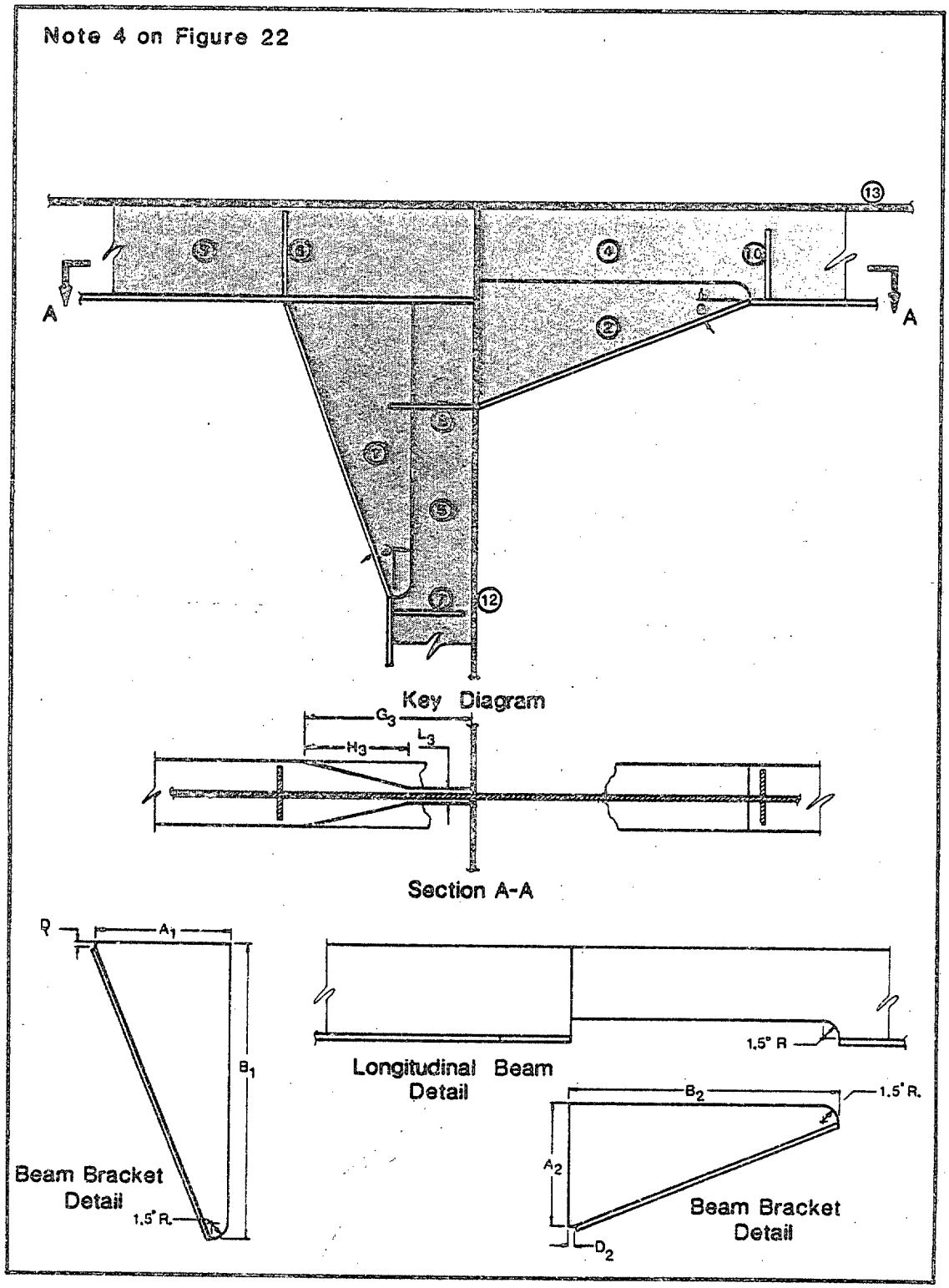

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FIGURE 27. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", bracket cut from rolled shape, l/d > 22.

Component #1	Beam Bracket on Stiffener Side of Bulkhead	
Calculate dimension A_1	If $2d_3 > .125\ \ell_3$ and $2d_3 > 2d_5 + 1"$	$A_1 = 2d_3 - t_{f3} - d_5 + 1.5"$
	If $2d_5 + 1" > .125\ \ell_3$ and $2d_5 + 1" > 2d_3$	$A_1 = d_5 - t_{f3} + 2.5"$
	If $.125\ \ell_3 > 2d_3$ and $.125\ \ell_3 > 2d_5 + 1"$	$A_1 = .125\ \ell_3 - t_{f3} - d_5 + 1.5"$
Calculate dimension B_1	If $2d_5 > .125\ \ell_5$	$B_1 = 2d_5$
	If $2d_5 \leq .125\ \ell_5$	$B_1 = .125\ \ell_5$
	If $B_1 + d_3 < A_2 + d_4 + 1.5$ and $A_2 + d_4 - B_1 - d_3 < 1.5$	$B_1 = A_2 + d_4 - d_3 - 1.5"$
Select dimension D_1	Always	$.125" < D_1 < .25"$
Calculate bkt angle	Always	$\theta_1 = \tan^{-1}(B_1 - D_1)/(A_1 - 1.5")$
Check angle range	If $20° < \theta_1 < 70°$	Refer to Figure 26 for ① ③ ⑤ ⑥ and ⑦
	If $\theta_1 < 20°$	Refer to Figure 28 for ① ③ ⑤ ⑥ and ⑦
Check depth of bkt against d_5	Always	$A_1' = (A_1 + (D_1 + t_{f5}/\sin\theta_1)/\tan\theta_1)\cos\theta_1$
	If $A_1' \leq d_5$	Cut bkt from section of bulkhead stiffener
	If $A_1' > d_5$	Bracket cannot be cut from section of bulkhead stiffener. Use Figure 25 or cut bkt from section with equivalent t_w, t_f and w_f and $d \geq A_1'$.
Component #2	Beam Bracket on Opposite Side of Bulkhead	
Calculate dimension A_2	If $d_4 < 6"$ or $d_4 > 20"$	$A_2 = d_4 - t_{f3} + 1.5"$
	If $6" \leq d_4 \leq 10"$	$A_2 = d_4 - t_{f3} + 2.5"$
	If $A_2 + d_4 < B_1 + d_3 - 1.5$ and $B_1 + d_3 - A_2 - d_4 < 4.5"$	$A_2 = B_1 + d_3 - d_4 + 1.5"$
Calculate dimension B_2	If $2d_4 > .125\ \ell_4$	$B_2 = 2d_4$
	If $2d_4 \leq .125\ \ell_4$	$B_2 = .125\ \ell_4$
Calculate dimension D_2	Always	$.125" < D_2 < .25"$
Calculate bkt angle	Always	$\theta_2 = \tan^{-1}(A_2 - 1.5")/(B_2 - D_2)$
Check angle range	If $\theta_2 > 20°$	Refer to Figure 26 for ② ④ ⑧ and ⑪
Check depth of bkt against d_4	Always	$A_2' = (A_2 + (D_2 + t_{f4}/\sin\theta_2))\tan\theta_2)\cos\theta_2$
	If $A_2' \leq d_4$	Cut bkt from section of bulkhead stiffener
	If $A_2' > d_4$	Bracket cannot be cut from section of longitudinal. Use Figure 29 or cut bkt from section with equivalent t_w, t_f and w_f and $d \geq A_1'$.
Component #3	Longitudinal Beam (Stiffener Side)	
Calculate cut back of flange	If longitudinal is continuous	$G_3' = A_1 + d_5 - 3.0"$
	If longitudinal is intercostal	$G_3 = A_1 + d_5 - 3.0"$
	Always	$H_3 = 1.5\ w_{f3}$
	Always	$L_3 = 3t_{w3} + .25"$
Component #4	Longitudinal Beam (Opposite Side)	
Calculate cut away of flange	If longitudinal is continuous	$G_4' = B_2 + t_b$
	If longitudinal is intercostal	$G_4 = B_2$

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FIGURE 27. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", bracket cut from rolled shape, 1/d > 22. - Continued

Component #5	Bulkhead Stiffener	
Calculate cut away of flange	Always	$G_5=B_1$
Component #6	Toe Bracket	
Select toe bracket	Always	Select toe bracket from Table 6. Member to be bracketed = ⑤. Thickness of backing structure = t_{w3}. Read corresponding dimensions from Table 7.
Check toe bracket clearance	If $a_6 \geq d_3-t_{f3}-t_{w3}$ or $b_6 \geq (w_{f3}-t_{w3}).5$ or $c_6 \leq k_3-t_{f3}$	Redesign toe bracket to suit application.
Component #7	Tangency Bracket	
Check requirement	If $b_1=A_2-1.5"$	Refer to component ⑨.
Select tangency bkt	If $B_1 \neq A_2-1.5"$	Select tangency bracket from Table 5. Member to be bracketed = ⑤.
Component #8	Toe Bracket	
Check requirement	If $B_1=A_2-1.5"$	Refer to component ⑨.
Select toe bracket	If $B_1 \neq A_2-1.5"$	Select toe bracket from Table 6. Member to be bracketed = ④. Thickness of backing structure = t_{w5}. Read corresponding dimensions from Table 9.
Check toe bracket clearance	If $B_1 \neq A_2-1.5"$ and: $a_8 > [(A_2-1.5")(A_1-1.5"/B_1)]+d_5-k_5$ $c_8 < t_{w5}$	Redesign toe bracket to suit application.
Component #9	In-line Bracket	
Check requirement	If $A_2 \neq B_1+1.5$	Refer to components ⑦ and ⑧.
Select in-line bkt	If $A_2=B_1+1.5$	Select in-line bracket from Table 8. Backing structure = ⑤. Thickness of supported flange = t_{f5}.
Component #10	Tangency Bracket	
Select tangency bkt	Always	Select tangency bracket from Table 5. Member to be bracketed = ④.
Component #11	Collar	
		No detail required
Component #12	Bulkhead	
	If longitudinal is intercostal	No detail required
	If longitudinal is continuous	$Q_{12}=d_4-1.375"$ $R_{12}=t_{w4}+.25"$

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FIGURE 27. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", bracket cut from rolled shape, l/d > 22. - Continued

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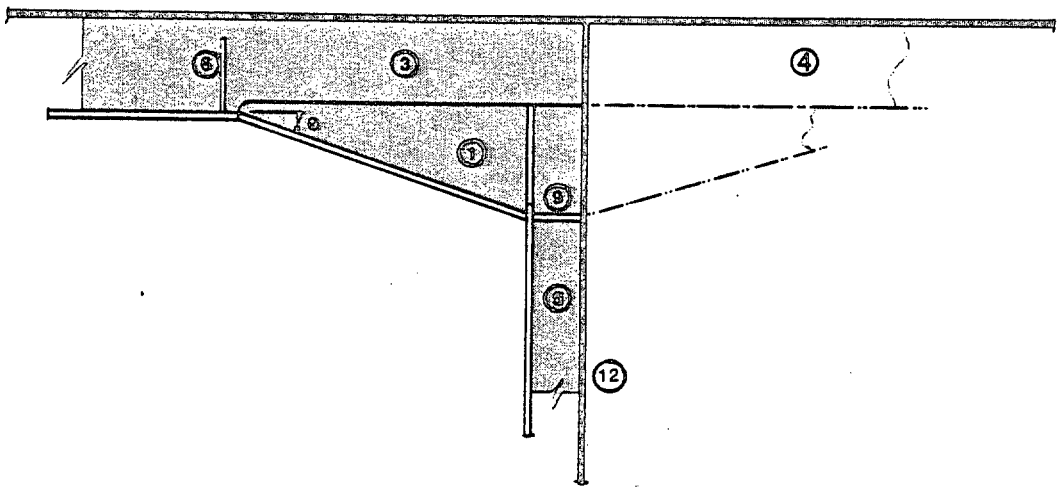
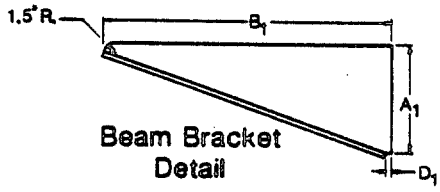
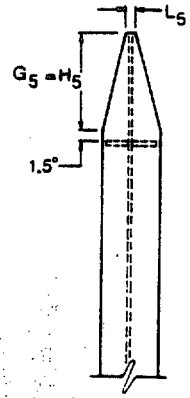
Note 4 on Figure 22



Key Diagram



Beam Bracket Detail



Bulkhead Stiffener Detail

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FIGURE 28. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", bracket cut from rolled shape, l/d > 22.

Component #1	Beam Bracket	
Calculate dimension A_1	If $d_3<6"$ or $d_3>20"$	$A_1=d_3-t_{f3}+1.5$
	If $6"<d_3<20"$	$A_1=d_3-t_{f3}+2.5$
	If $\theta_2>20°$ and $A_2>A_1$ and $A_2-A_1<3"$	$A_1=A_2$
	If $\theta_2\leq 20°$ and $A_2>A_1+1.5"$ and $A_2-A_1<4.5"$	$A_1=A_2-1.5"$
Calculate dimension B_1	If $2d_3>.125\ \ell_3$	$B_1=2d_3$
	If $2d_3\leq .125\ \ell_3$	$B_1=.125\ \ell_3$
Select dimension D_1	Always	$.125"<D_1<.25"$
Calculate bkt angle	Always	$\theta_1=\tan^{-1}(A_1-1.5")/(B_1-D_1)$
Check angle range	If $20°<\theta_1<70°$	Refer to Figure 26.
	If $\theta_1>70°$	Refer to Figure 27.
Check depth of bkt against d_3	Always	$A_1'=(A_1+(D_1+t_{f3}/\sin\theta_1)\tan\theta_1)\cos\theta_1$
	If $A_1'\leq d_3$	Cut bkt from section of longitudinal.
	If $A_1'>d_3$	Bracket cannot be cut from section of longitudinal. Use Figure 29 or cut bkt from section with equivalent t_w, t_f and w_f and $d\geq A_1'$.
Component #2	Beam Bracket	
		Identical to brackets of Figure 26 or 27
Component #3	Longitudinal Beam (Stiffener Side)	
Calculate dimension G_3	If longitudinal is continuous and $L_4=0$	$G_3=B_1$
	If longitudinal is continuous and $L_4\neq 0$	$G_3=B_1+t_b$
	If longitudinal is intercostal	$G_3=B_1$
Component #4	Longitudinal Beam (Opposite Side)	
Calculate dimension G_4	If longitudinal is continuous and $L_4\neq 0$	$G_4=B_4$
	Otherwise	G_4 as determined by Figures 26 or 28
Component #5	Bulkhead Stiffener	
Calculate dimension H_5	Always	$H_5=A_1-1.5"$
Calculate dimension L_5	Always	$L_5=3t_{w5}+.25"$
Component #6	Tangency Bracket	
Select tangency bkt	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.

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FIGURE 28. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", bracket cut from rolled shape, 1/d > 22. - Continued

Component #7	Toe Bracket	
Check requirement	If ($\theta_2<20°$ and $A_1=A_2$) or ($\theta_2>20°$ and $A_1=1.5A_2$)	Refer to component ⑨.
	Otherwise	Select toe bracket from Table 6. Member to be bracketed = ④. Thickness of backing structure = t_{w3}. Read corresponding dimensions from Table 7.
Check toe bracket clearance	If $a_7>d_5-t_{f5}-t_{w5}$ or $a_7>.5(w_{f5}-t_{w5})$ or $c_7<k_5-t_{f5}$	Redesign toe bracket to suit application.
Component #8	Toe Bracket	
Check requirement	If ($\theta_2<20°$ and $A_1=A_2$) or ($\theta_2>20°$ and $A_1=1.5=A_2$)	Refer to component ⑨.
	Otherwise	Select tangency bracket from Table 5. Member to be bracketed = ④. Thickness of backing structure = t_{w5}.
Check toe bracket clearance	If $a_8>d_5-k_5$ or $c_8<t_{w5}$	Redesign toe bracket to suit application
Component #9	In-line Bracket	
Check requirement	If ($\theta_2<20°$ and $A_1\neq A_2$) or ($\theta_2>20°$ and $A_1=1.5\neq A_2$)	Refer to components ⑦ and ⑧.
Select in-line bkt	Otherwise	Select in-line bracket from Table 8. Backing structure = ⑤. Thickness of supported flange = t_{w3}.
Component #10	Tangency Bracket	
		Refer to Figure 26 or 27
Component #11	Collar	
		Not required
Component #12	Bulkhead	
	If bulkhead is intercostal	No detail required
	If bulkhead is continuous	$Q_{12}=d_3-1.375"$ $R_{12}=t_{w3}+.25"$

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FIGURE 28. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", bracket cut from rolled shape, 1/d > 22. - Continued

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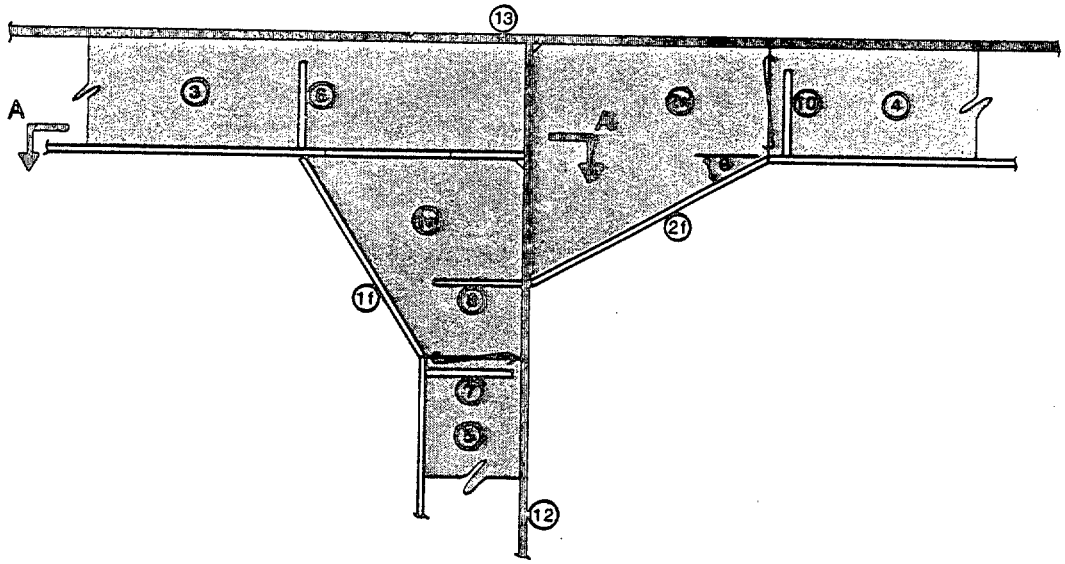
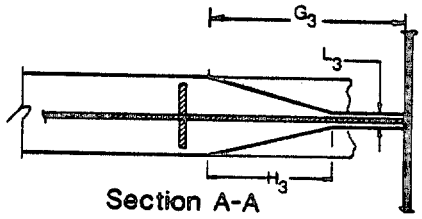
Note 4 on Figure 22



Key Diagram



Section A-A

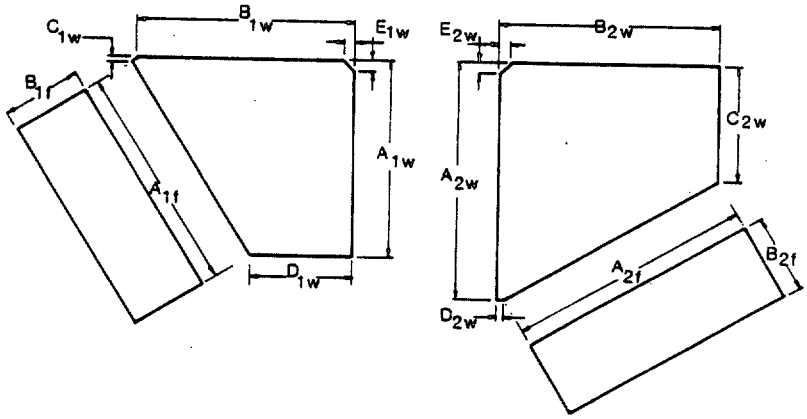


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FIGURE 29. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", built-up.

Component #1a	Beam Bracket Web (Stiffener Side)	
Calculate dimension A_{1a}	If $2d_5 > .125\ \ell_5$	$A_{1a} = 2d_5$
	If $2d_5 \leq .125\ \ell_5$	$A_{1a} = .125\ \ell_5$
	If $A_{1a} < A_{2a} - d_3$ and $A_{2a} - d_3 - A_1 < 3"$	$A_{1a} = A_{2a} - d_3$
Calculate dimension B_{1a}	If $2d_3 > .125\ \ell_3$ and $2d_3 > 2d_5 + 1"$	$B_{1a} = 2d_3 - t_{f5}$
	If $.125\ \ell_3 \geq 2d_3$ and $.125\ \ell_3 \geq 2d_5 + 1$	$B_{1a} = .125\ \ell_3 - t_{f5}$
	If $2d_5 + 1 > .125\ \ell_3$ and $2d_5 + 1 > 2d_3$	$B_{1a} = 2d_5 - t_{f5} + 1"$
Select dimension C_{1a}	Always	$.125" \leq C_{1a} \leq .25"$
Calculate dimension D_{1a}	Always	$D_{1a} = d_5 - t_{f5}$
Calculate dimension E_{1a}	If $t_{f4} > t_{12}$ and $t_{12} > .5$	$E_{1a} = t_{12}$
	If $t_{f4} \leq t_{12}$ and $t_{f4} > .5$	$E_{1a} = t_{f4}$
	If $t_{f4} < .5$ or $t_{12} < .5$	$E_{1a} = .5$
Calculate thickness	If $t_{w5} > .1875$	$T_{1a} = t_{w5}$
	If $t_{w5} \leq .1875$	$T_{1a} = .1875$
Component #1b	Beam Bracket Flange (Stiffener Side)	
Calculate dimension A_{1b}	Always	$A_{1b} = ((B_{1a} - D_{1a})^2 + (A_{1a} - C_{1a})^2)^{1/2}$
Calculate dimension B_{1b}	Always	$B_{1b} = w_{f5}$
Calculate thickness	Always	$T_{1b} = t_{f5}$
Component #2a	Beam Bracket Web (Opposite Side)	
Calculate dimension A_{2a}	If $d_4 < 6"$ or $d_4 > 20"$	$A_{2a} = 2d_4 - t_{f4}$
	If $6" \leq d_4 \leq 20"$	$A_{2a} = 2d_4 - t_{f4} + 1$
	If $A_{1a} > A_{2a} - d_3$ and $A_{1a} - (A_{2a} - d_3) < 3"$	$A_{2a} = A_{1a} + d_3$
Calculate dimension B_{2a}	If $2d_4 > .125\ \ell_4$	$B_{2a} = 2d_4$
	If $2d_4 \leq .125\ \ell_4$	$B_{2a} = .125\ \ell_4$
Calculate dimension C_{2a}	Always	$C_{2a} = d_4 - t_{f4}$
Select dimension D_{2a}	Always	$.125" < D_{2a} < .25"$
Calculate dimension E_{2a}	If $t_{12} > t_{13}$ and $t_{13} > .5$	$E_{2a} = t_{13}$
	If $t_{12} \leq t_{13}$ and $t_{12} > .5$	$E_{2a} = t_{12}$
	If $t_{12} \leq .5$ or $t_{13} \leq .5$	$E_{2a} = .5$
Calculate thickness	If $t_{w5} > .1875$	$T_{2a} = t_{w5}$
	If $t_{w5} \leq .1875$	$T_{2a} = .1875$
Component #2b	Beam Bracket Web (Opposite Side)	
Calculate dimension A_{2b}	Always	$A_{2b} = ((B_{2a} - D_{2a})^2 + (A_{2a} - C_{2a})^2)^{1/2}$
Calculate dimension B_{2b}	Always	$B_{2b} = w_{f4}$
Calculate thickness	If $t_{f4} > .1875$	$T_{2b} = t_{f4}$
	If $t_{f5} \leq .1875$	$T_{2b} = .1875$
Component #3	Longitudinal (Stiffener Side)	
Optional cut back of flange	Always	$G_3 = B_{1a} - 1.5$
	If $1.5\ w_f < G_3$	$H_3 = 1.5\ w_f$
	If $1.5\ w_f \geq G_3$	$H_3 = G_3$
	Always	$L_3 = 3t_w + .25"$

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FIGURE 29. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6", and < 10", built-up. - Continued

Component #4	Longitudinal (Opposite Side)	
		No detail required
Component #5	Bulkhead Stiffener	
		No detail required
Component #6	Toe Bracket	
Select toe bracket	Always	Select toe bracket from Table 6. Member to be bracketed = ⑤. Thickness of backing structure = t_{w3}. Read corresponding dimension from Table 7.
Check toe bracket	If $a_6 > d_3 - t_{f3} - t_{w3}$ or $b_6 > (w_{f3} - t_{w3}).5$ or $c_6 < k_3 - t_{f3}$	Redesign toe bracket to suit application.
Component #7	Tangency Bracket	
Check requirement	If $A_{1a} + d_3 = A_{2a}$	Refer to component ⑨.
Select tangency bkt	If $A_{1a} + d_3 \neq A_{2a}$	Select tangency bracket from Table 5. Member to be bracketed = ⑤.
Component #8	Toe Bracket	
Check requirement	If $A_{1a} + d_3 = A_{2a}$	Refer to component ⑨.
Select toe bracket	If $A_{1a} + d_3 \neq A_{2a}$	Select toe bracket from Table 6. Member to be bracketed = ④. Thickness of backing structure = t_{w5}. Read corresponding dimensions from Table 7.
Check toe bracket	If $a_8 > (A_{1a} + d_3 - A_{2a})(A_{1a})/(B_{1a} - d_5) + d_5 - k_5$ or $c_8 < T_{1a}$	Redesign toe bracket to suit application.
Component #9		
Check requirement	If $A_{1a} + d_3 \neq A_{2a}$	Refer to components ⑦ and ⑧.
Calculate dimension A_9	If $A_{1a} + d_3 = A_2$	$A_9 = w_{f5}$
Calculate dimension B_9	Always	$B_9 = D_{1a}$
Calculate thickness	Always	$T_9 = T_{1b}$
Component #10	Tangency Bracket	
Select tangency bkt	Always	Select tangency bracket from Table 5. Member to be bracketed = ④.
Component #11	Collar	
		Not required
Component #12	Bulkhead	
		No detail required

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FIGURE 29. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 6" and < 10", built-up. - Continued

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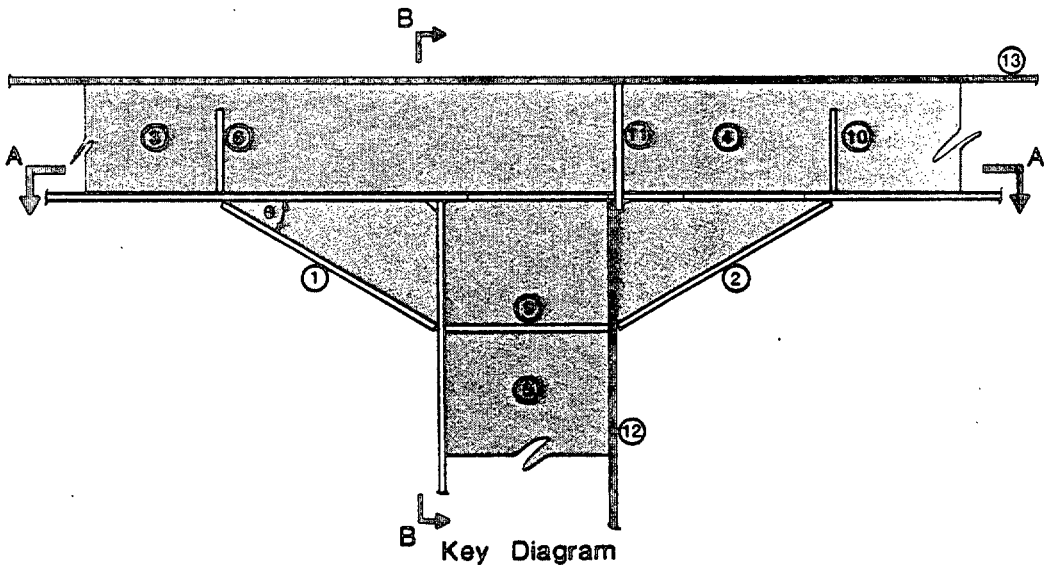
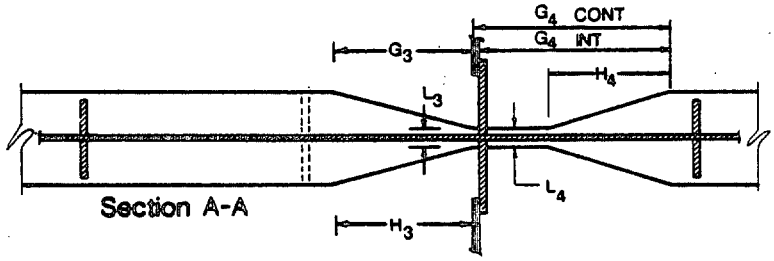
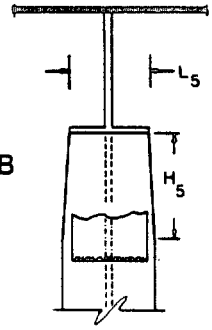
Note 3 on Figure 22



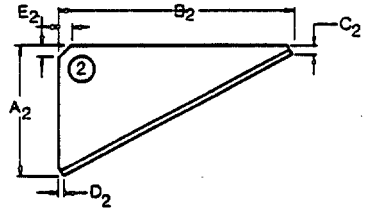
Key Diagram



Section A-A



Section B-B



Beam Bracket Detail

Note: Dimension labeling for component #1 similar.

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FIGURE 30. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 10", bracket cut from rolled shape, l/d < 26.

Component #1	Beam Bracket (Stiffener Side)	
Calculate dimension A_1	If $d_3<6"$ or $d_3>20"$	$A_1=d_3-t_{f3}$
	If $6"\leq d_3\leq 20"$	$A_1=d_3-t_{f3}+1"$
Calculate dimension B_1	If $2d_3<.125\ \ell_3$	$B_1=2d_3$
	If $2d_3\geq .125\ \ell_3$	$B_1=.125\ \ell_3$
Select dimension C_1	Always	$.125"\leq C_1\leq .25"$
Select dimension D_1	Always	$.125"\leq D_1\leq .25"$
Calculate dimension E_1	If $t_{f5}>t_{f3}$ and $t_{f3}>.5"$	$E_1=t_{f3}$
	If $t_{f5}\leq t_{f3}$ and $t_{f5}>.5"$	$E_1=t_{f5}$
	If $t_{f5}\leq .5"$ or $t_{f3}\leq .5"$	$E_1=.5"$
Calculate bkt angle	Always	$\theta_1=\tan^{-1}[(A_1-C_1)/(B_1-D_1)]$
Check angle range	If $\theta_1<20°$	Refer to Figure 31, components ① and ③
Check depth of bkt against d_3	Always	$A_1'=(A_1-E_1+(D_1+t_{f3}/\sin\theta_1)\tan\theta_1)\cos\theta_1$
		$B_1'=(B_1-E_1+(C_1+t_{f3}/\sin\theta_1)/(\tan\theta_1))\cos\theta_1$
	If $A_1'\leq d_3$ and $B_1'\leq d_3$	Cut bracket from section of longitudinal.
	If $A_1'>d_3$ or $B_1'>d_3$	Bracket cannot be cut from section of longitudinal. Use Figure 32 or cut bkt from section with equivalent t_w, t_f and w_f and $d > A_1'$ and $d > B_1'$.
Component #2	Beam Bracket (Opposite Side)	
Calculate dimension A_2	If $d_4<6"$ or $d_4>20"$	$A_2=d_4-t_{f4}$
	If $6"\leq d_4\leq 20"$	$A_2=d_4-t_{f4}+1"$
B_2	If $2d_4<.125\ \ell_4$	$B_2=2d_4$
	If $2d_4\geq .125\ \ell_4$	$B_2=.125\ \ell_4$
C_2	Always	$.125"\leq C_2\leq .25"$
D_2	Always	$.125"\leq D_2\leq .25"$
E_2	If $t_{f2}>t_{f4}$ and $t_{f4}>.5"$	$E_2=t_{f4}$
	If $t_{f2}<t_{f4}$ and $t_{f2}>.5"$	$E_2=t_{f2}$
	If $t_{f2}\leq .5"$ or $t_{f4}\leq .5"$	$E_2=.5"$
θ_2	Always	$\theta_2=\tan^{-1}[(A_2-C_2)/(B_2-D_2)]$
	If $\theta_2<20°$	Refer to Figure 27, components ② and ④
	Always	$A_2'=(A_2-E_2+(D_2+t_{f4}/\sin\theta_2))\tan\theta_2)\cos\theta_2$
		$B_2'=(B_2-E_2+(C_2+t_{f4}/\sin\theta_2)/\tan\theta_2)\cos\theta_2$
		Cut bracket from section of longitudinal. Bracket cannot be cut from section of bulkhead stiffener. Use Figure 32 or cut bracket from section with equivalent t_w, t_f, and w_f and $d > A_2'$ and $d > B_2'$.
Component #3	Longitudinal Beam (Stiffener Side)	
Optional G_3	If $d_5-1.5">1.5\ w_{f3}$	$1.5\ w_f<G_3<d_5-1.5"$
	If $d_5-1.5"\leq 1.5\ w_{f3}$	$G_3=d_5-1.5"$
Optional H_3	If $d_5-1.5">1.5\ w_{f3}$	$H_3=1.5\ w_{f3}$
	If $d_5-1.5"\leq 1.5\ w_{f3}$	$H_3=d_5-1.5"$
Optional L_3	Always	$3t_{w3}+.25"$

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FIGURE 30. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 10", bracket cut from rolled shape, 1/d < 26. - Continued

Component #4	Longitudinal Beam (Opposite Side)	
G_4 H_4 L_4	Always Always Always	$G_4=B_2-1.5"$ $H_4=1.5\ w_{f4}$ $L_4=3t_{w4}+.25"$
Component #5	Bulkhead Stiffener	
 H_5 L_5	If $w_{f5}\leq w_{f3}$ If $w_{f5}>w_{f3}$ If $w_{f5}>w_{f3}$	No detail required ($H_5=L_5=0$) $H_5=A_1-1.5"$ $L_5=w_{f3}$
Component #6	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7	Toe Bracket	
		Not required
Component #8	Toe Bracket	
		Not required
Component #9	In-line Bracket	
	Always	Select in-line bracket from Table 8. Backing member = ⑤. Thickness of supported flange = t_{f3}.
Component #10	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ④.
Component #11	Collar	
	If longitudinal is intercostal If longitudinal is continuous and: Bulkhead is watertight Bulkhead is not watertight	No detail required Select lapped or flush collar from Table 13 or 14. Member to be collared = ③. Select lug collar from Table 12. Member to be collared = ③.
Component #12	Bulkhead (Cutout)	
	If longitudinal is intercostal If longitudinal is continuous and: Optional cutback is used Optional cutback is not used	No detail required $Q_{12}=d_3+.125"$ $R_{12}=3t_{w3}+1.75"$ $Q_{12}=d_3+.125"$ $R_{12}=w_{f3}+1.5"$

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FIGURE 30. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 10", bracket cut from rolled shape, 1/d < 26. - Continued

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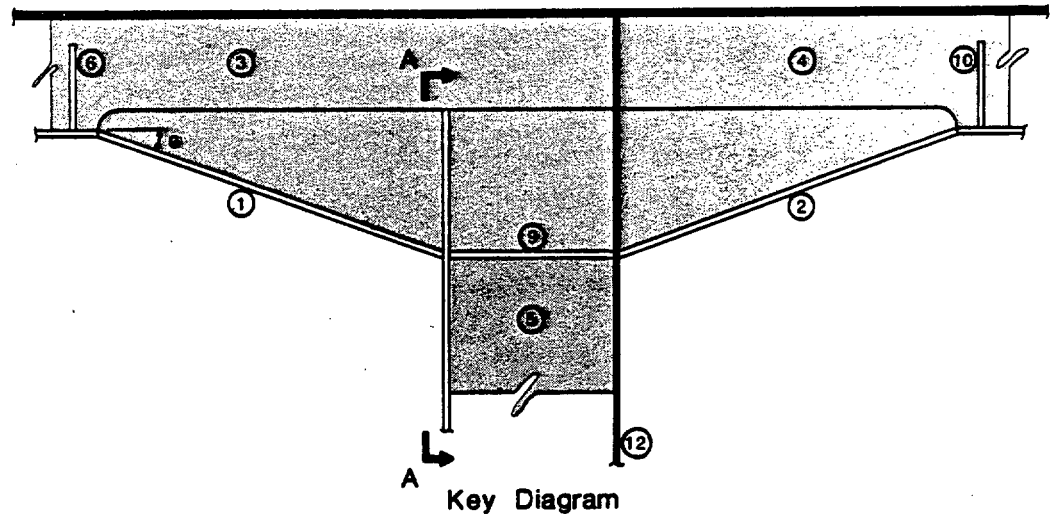
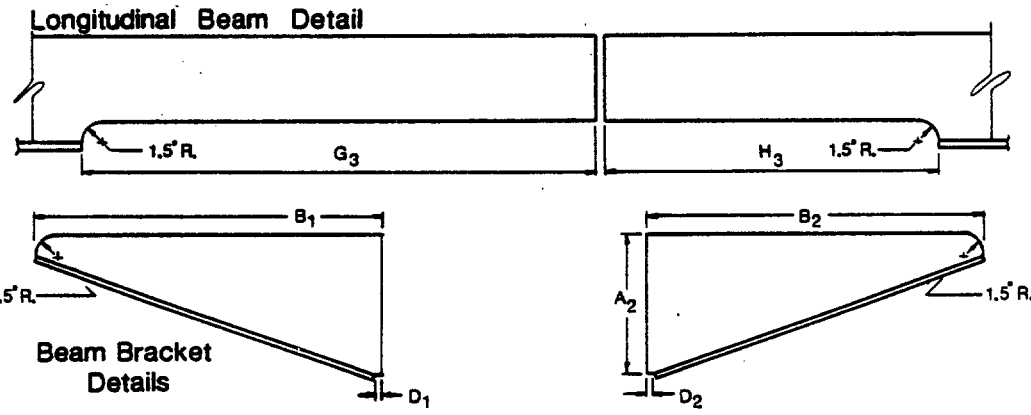
Note 4 on Figure 22





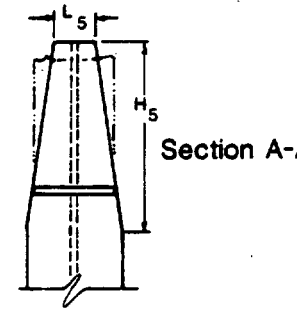


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FIGURE 31. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 10", bracket cut from rolled shape, l/d > 22.

Component #1	Beam Bracket (Stiffener Side)	
A_1	If $d_2<6"$ or $d_2>20"$	$A_1=d_2-t_{f3}+1.5"$
	If $6"\leq d_2\leq 20"$	$A_1=d_2-t_{f3}+2.5"$
B_1	If $2d_3>.125\ \ell_3$	$B_1=2d_3$
	If $2d_3\leq .125\ \ell_3$	$B_1=.125\ \ell_3$
D_1	Always	$.125"\leq D_1\leq .25"$
Θ_1	Always	$\Theta_1=\tan^{-1}((A_1-D_1)/(B_1-1.5"))$
	If $\Theta_1>20°$	Refer to Figure 30.
A_1'	Always	$A_1'=(A_1+(D_1+t_{f3}/\sin\Theta_1)\tan\Theta_1)\cos\Theta_1$
	If $A_1'<d_3$	Cut bracket from section of longitudinal.
	If $A_1'>d_3$	Bracket cannot be cut from section of longitudinal. Use Figure 32 or cut bkt from section with equivalent t_w, t_f and w_f and $d > A_1'$.
Component #2	Beam Bracket (Opposite Side)	
A_2	If $d_4<6"$ or $d_4>20"$	$A_2=d_2-t_{f4}+1.5$
	If $6"\leq d_4\leq 20"$	$A_2=d_2-t_{f4}+2.5$
B_2	If $2d_4>.125\ \ell_4$	$B_2=2d_4$
	If $2d_4\leq .125\ \ell_4$	$B_2=.125\ \ell_4$
D_2	Always	$.125"\leq D_2\leq .25"$
Θ_2	Always	$\Theta_2=\tan^{-1}((A_2-D_2)/(B_2-1.5"))$
	If $\Theta_2>20°$	Refer to Figure 30 for ② and ④.
A_2'	Always	$A_2'=(A_2+(D_2+t_{f4}/\sin\Theta_2)\tan\Theta_2)\cos\Theta_2$
	If $A_2'<d_4$	Cut bracket from section of longitudinal.
	If $A_2'>d_4$	Bracket cannot be cut from section of longitudinal. Use Figure 32 or cut bkt from section with equivalent t_w, t_f and w_f and $d > A_2'$.
Component #3	Longitudinal (Stiffener Side)	
G_3	If longitudinal is intercostal	$G_3=d_5+B_1$
	If longitudinal is continuous and	
	$\Theta_2>20°$	$G_3=d_5+B_1+t_b$
	$\Theta_2\leq 20°$	$G_3=d_5+B_1$
Component #4	Longitudinal (Opposite Side)	
G_4	If longitudinal is intercostal	$G_4=B_2$
	If longitudinal is continuous and	
	$\Theta_2>20°$	$G_4=B_2$
	$\Theta_2\leq 20°$	$G_4=B_2+t_b$
Component #5	Bulkhead Stiffener	
H_5	If $1.5\ w_{f5}>A_1-1.5"$	$H_5=A_1-1.5"$
	If $1.5\ w_{f5}\leq A_1-1.5"$	$H_5=1.5\ w_{f5}$
L_5	Always	$L_5=3t_{w5}+.25"$

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FIGURE 31. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 10", bracket cut from rolled shape, 1/d > 22. - Continued

Component #6	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7	Toe Bracket	
		Not required
Component #8	Toe Bracket	
		Not required
Component #9	In-line Bracket	
	Always	Select in-line bracket from Table 5. Backing member = ⑤. Thickness of supported flange = t_{f2}.
Component #10	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ④.
Component #11	Collar	
		Not required
Component #12	Bulkhead	
		$Q_{12} = d_4 - 1.5"$ $R_{12} = t_{w4} + .25"$

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FIGURE 31. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 10", bracket cut from rolled shape, 1/d > 22. - Continued

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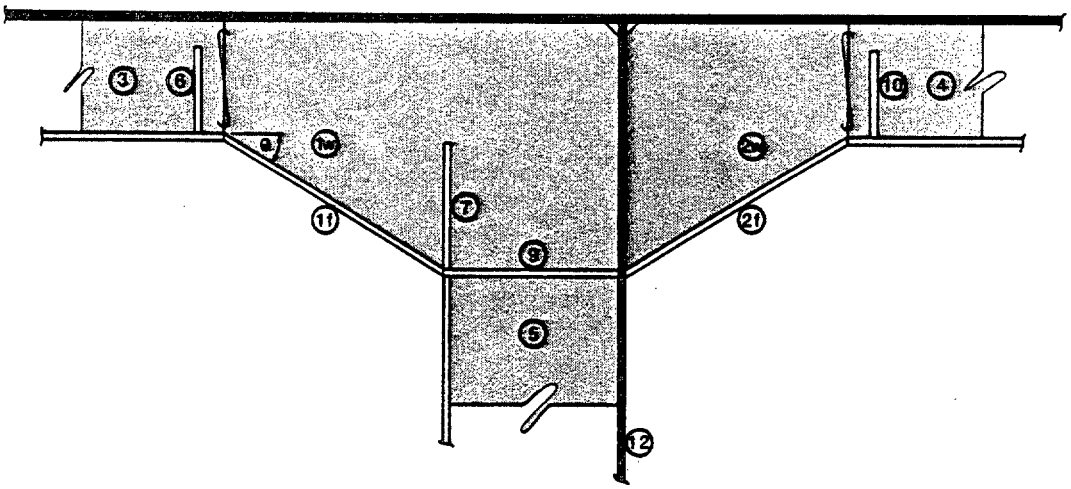
Note 4 on Figure 22



Key Diagram

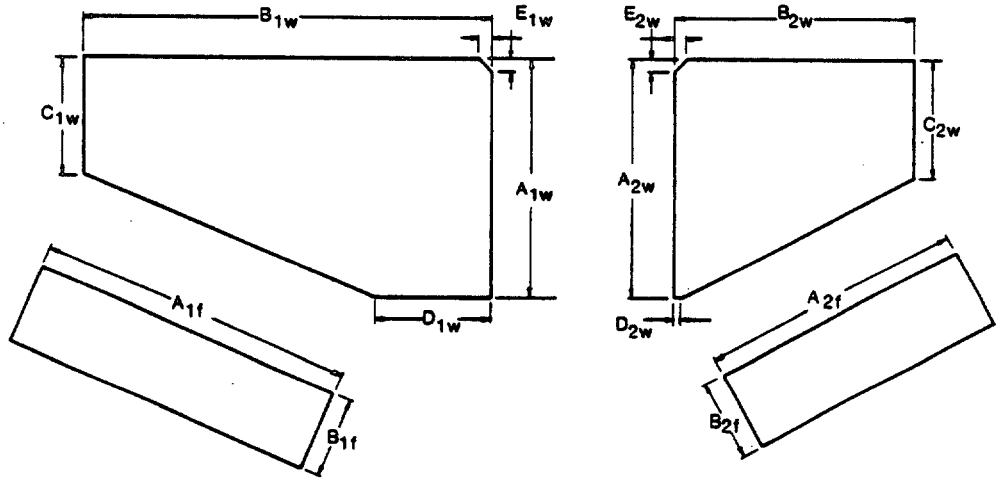


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FIGURE 32. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 10", built-up.

Component #1a	Beam Bracket Web (Stiffener Side)	
A_{1a}	If $d_3<6"$ or $d_3>20"$	$A_{1a}=2d_3-t_{f3}$
	If $6" \leq d_3 \leq 20"$	$A_{1a}=2d_3-t_{f3}+1.5$
B_{1a}	If $2d_3>.125\ \ell_3$	$B_{1a}=2d_3+d_5$
	If $2d_3 \leq .125\ \ell_3$	$B_{1a}=.125\ \ell_3+d_5$
C_{1a}	Always	$C_{1a}=d_3-t_{f3}$
D_{1a}	Always	$D_{1a}=d_5+.125"$
E_{1a}	If bracket is continuous	$E_{1a}=0$
	If bracket is intercostal and:	
	$t_{12}>t_{13}$ and $t_{13}>.5"$	$E_{1a}=t_{13}$
	$t_{12} \leq t_{13}$ and $t_{12}>.5"$	$E_{1a}=t_{12}$
	$t_{12} \leq .5"$ or $t_{13} \leq .5"$	$E_{1a}=.5"$
Thickness	Always	$T_{1a}=t_{w3}$
Component #1b	Beam Bracket Flange (Stiffener Side)	
A_{1b}	Always	$A_{1b}=[(A_{1a}-C_{1a})^2+(B_{1a}-D_{1a})^2]^{1/2}$
B_{1b}	Always	$B_{1b}=w_{f3}$
T_{1b}	Always	$T_{1b}=t_{f3}$
Component #2a	Beam Bracket Web (Opposite Side)	
A_{2a}	If $d_4<6"$ or $d_4>20"$	$A_{2a}=2d_4-t_{f4}$
	If $6" \leq d_4 \leq 20"$	$A_{2a}=2d_4-t_{f4}+1"$
B_{2a}	If bracket is intercostal and:	
	$2d_4>.125\ \ell_4$	$B_{2a}=2d_4$
	$2d_4 \leq .125\ \ell_4$	$B_{2a}=.125\ \ell_4$
	If bracket is continuous and:	
	$2d_4>.125\ \ell_4$	$B_{2a}=2d_4+t_b$
	$2d_4 \leq .125\ \ell_4$	$B_{2a}=.125\ \ell_4+t_b$
C_{2a}	Always	$C_{2a}=d_4-t_{f4}$
D_{2a}	If bracket is intercostal	$.125" \leq D_{2a} \leq .25"$
	If bracket is continuous	$.125"+t_b \leq D_{2a} \leq .25"+t_b$
E_{2a}	If bracket is continuous	$E_{2a}=0$
	If bracket is intercostal and:	
	$t_{12}>t_{13}$ and $t_{13}>.5"$	$E_{2a}=t_{13}$
	$t_{12} \leq t_{13}$ and $t_{12}>.5"$	$E_{2a}=t_{12}$
	$t_{12} \leq .5"$ and $t_{13} \leq .5"$	$E_{2a}=.5"$
T_{2a}	Always	$T_{2a}=t_{w4}$
Component #2b	Beam Bracket Web (Opposite Side)	
A_{2b}	Always	$A_{2b}=[(A_{2a}-C_{2a})^2+(B_{2a}-D_{2a})^2]^{1/2}$
B_{2b}	Always	$B_{2b}=w_{f3}$
T_{2b}	Always	$T_{2b}=t_{f4}$

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FIGURE 32. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 10", built-up. - Continued

Component #3		
		No detail required
Component #4		
		No detail required
Component #5		
		No detail required
Component #6	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7	Toe Bracket	
	Always	Select toe bracket from Table 6. Member to be bracketed = ⑤. Thickness of backing structure = t_{w3}. Read corresponding dimensions from Table 7.
	If $a_7 > A_{1a} - t_{w3}$ or $b_7 > (B_9 - T_{1a}).5$ or $c_7 > t_{w3}$	Redesign toe bracket to suit application.
Component #9	Intermediate Flange	
A_9	Always	$A_9 = D_{1a}$
B_9	Always	$B_9 = B_{1b}$
T_9	Always	$T_9 = T_{1b}$
Component #10	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ④.
Component #11	Collar	
		Not required
Component #12	Bulkhead	
	If bracket is intercostal	No detail required
	If bracket is continuous	$Q_{12} = A_{1a}$ $R_{12} = T_{1a} + .25"$

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FIGURE 32. Longitudinal beam bracket in way of bulkhead stiffener: Bulkhead stiffener depth > 10", built-up. - Continued

DEPTH RATIO		BRACKET CONSTRUCTION		l/d RATIO		FIGURE NUMBER	NOTES
$\frac{d}{d'}>2.0$	$\frac{d}{d'}<2.5$	CUT FROM ROLLED SHAPE	BUILT UP FROM PLATE	$\frac{l}{d}<26$	$\frac{l}{d}>22$		
●		●		●		34	Note 3
●		●			●	35	Note 4
●			●	●	●	36	Note 4
	●	●		●		37	Note 3
	●	●			●	38	Note 4
	●		●	●	●	39	Note 4

1. DEPTH RATIO = $\frac{\text{DEPTH OF TRANSVERSE}}{\text{DEPTH OF LONGITUDINAL}} = \frac{d}{d'}$

   For ratios between 2.0 and 2.5 configuration of detail is also a function of the depth of the longitudinal.
2. Overlap of l/d RATIO is intentional
3. Flange snipes are not used on primary structure.
4. This detail is not used for primary structure.

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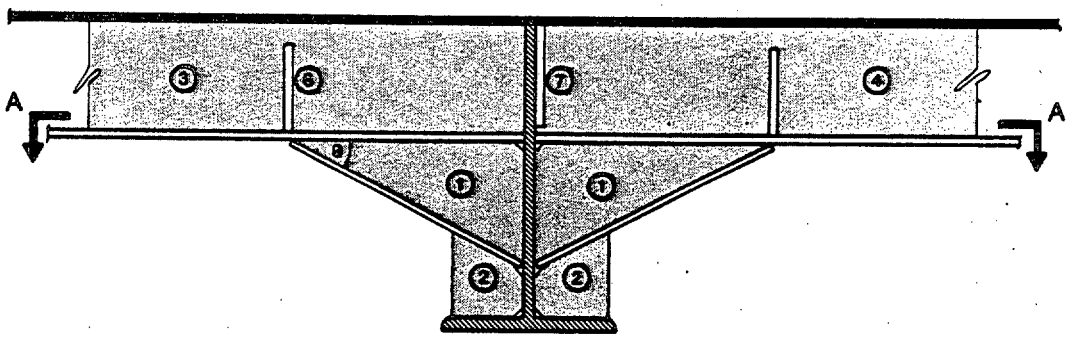
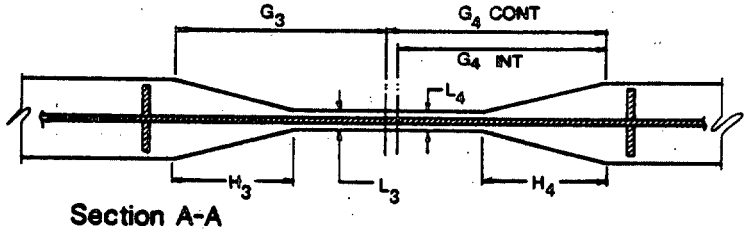
FIGURE 33. Applicability index for intersections of longitudinal beam and transverse beam.

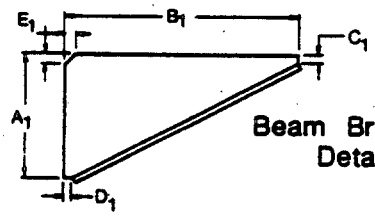
Note 3 on Figure 33



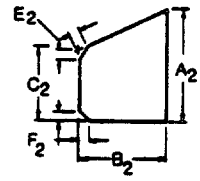
Key Diagram



Section A-A



Beam Bracket Detail



Chock Detail

SH 12985

FIGURE 34. Intersections of longitudinal and deep transverse: Bracket cut from rolled shape, 1/d < 26.

Component #1		Beam Bracket (Identical Both Sides)	
	A_1	If $d_3<6"$ or $d_3>20"$	$A_1=d_3-t_{f3}$
		If $6"\leq d_3\leq 20"$	$A_1=d_3-t_{f3}+1"$
		If $d_3+A_1+t_{f3}+1.5">d_5-t_{f5}$	Refer to Figure 37
	B_1	If $2d_3>.125\ \ell_3$	$B_1=2d_3$
		If $2d_3\leq .125\ \ell_3$	$B_1=.125\ \ell_3$
	C_1	Always	$.125"\leq C_1\leq .25"$
	D_1	Always	$.125"\leq D_1\leq .25"$
	Θ_1	Always	$\Theta_1=\tan^{-1}(A_1-C_1)/(B_1-D_1)$
		If $\Theta_1<20°$	Refer to Figure 31
	E_1	If $t_{f3}>t_{w5}$ and $t_{w4}>.5"$	$E_1=t_{w5}$
		If $t_{f3}\leq t_{w5}$ and $t_{f3}>.5"$	$E_1=t_{f3}$
		If $t_{f3}\leq .5"$ or $t_{w5}\leq .5"$	$E_1=.5"$
	A_1'	Always	$A_1'=(A_1-E_1+(D_1+t_{f3}/\sin\Theta_1)\tan\Theta_1)\cos\Theta_1$
	B_1'	Always	$B_1'=(B_1-E_1+(C_1+t_{f3}/\sin\Theta_1)/(\tan\Theta_1))\cos\Theta_1$
		If $A_1'\leq d_3$ and $B_1'\leq d_3$	Cut bracket from section of ③.
		If $A_1'>d_3$ or $B_1'>d_3$	Bracket cannot be cut from section of ③. Use Figure 36 or cut bracket from section with equivalent t_w, t_f and w_f and $d > A_1'$ and $d > B_1'$.
Component #2		Chock Detail (Identical Both Sides)	
	A_2	Always	$A_2=d_5-d_3-A_1-D_1\ \tan\Theta_1-t_{f3}/\cos\Theta_1$
	B_2	Always	$B_2=(w_{f5}-t_{w5}).5-.25"$
	C_2	Always	$C_2=A_2+B_2\ \tan\Theta_1$
	E_2	Always	$E_2=t_{f3}\ \sin\Theta_1+D_1/\cos\Theta_1+.125"$
	F_2	If $k_5-t_{f5}+.125">.5"$	$F_2=k_5-t_{f5}+.125"$
		If $k_5-t_{f5}+.125"\leq .5"$	$F_2=.5"$
	T_2	Always	$T_2=t_{w3}$
Component #3		Longitudinal Beam (Molded Side)	
Optional	G_3	Always	$G_3=B_1-1.5"$
	H_3	If $G_3<1.5\ w_{f3}$	$H_3=G_3$
		If $G_3\geq 1.5\ w_{f3}$	$H_3=1.5\ w_{f3}$
	L_3	Always	$L_3=3t_{w3}+.25"$
Component #4		Longitudinal Beam (Opposite Side)	
	G_4	If longitudinal is continuous	$G_4=B_1-1.5"+t_b$
		If longitudinal is intercostal	$G_4=B_1-1.5"$
	H_4	If $G_4<1.5\ w_{f3}$	$H_4=G_4$
		If $G_4\geq 1.5\ w_{f3}$	$H_4=1.5\ w_{f3}$
	L_4	Always	$L_4=3t_{w3}+.25"$
Component #5		Transverse	
		If longitudinal is intercostal	No detail required
		If longitudinal is continuous	$Q_5=d_3+.125"$
			$R_5=w_{f3}+1.5"$

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FIGURE 34. Intersections of longitudinal and deep transverse: Bracket cut from rolled shape, $1/d < 26$. - Continued

Component #6	Tangency Bracket (Identical Both Sides)	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7	Collar	
	If longitudinal is intercostal	No detail required
	If longitudinal is continuous and:	
	Shear loading is high	Select flush or lapped collar from Table 13 or 14. Piercing member = ③.
	Shear loading is not high	Select lug collar from Table 12. Piercing member = ③.
Component #8	Deck	
		No detail required

SH 12985

FIGURE 34. Intersections of longitudinal and deep transverse: Bracket cut from rolled shape, 1/d < 26. - Continued

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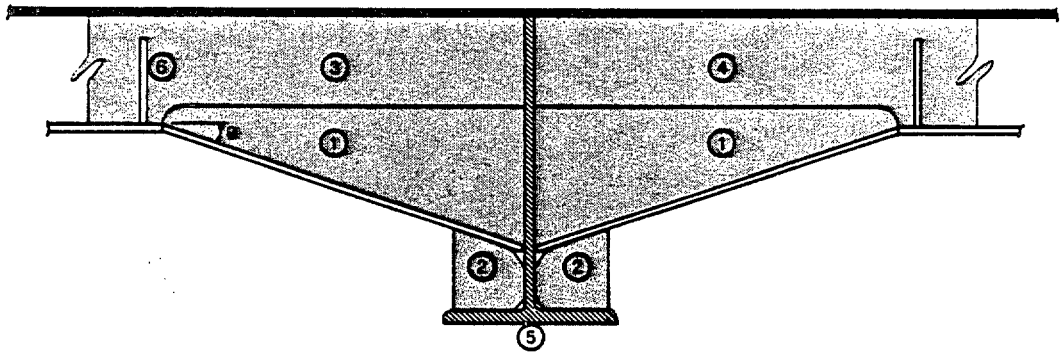
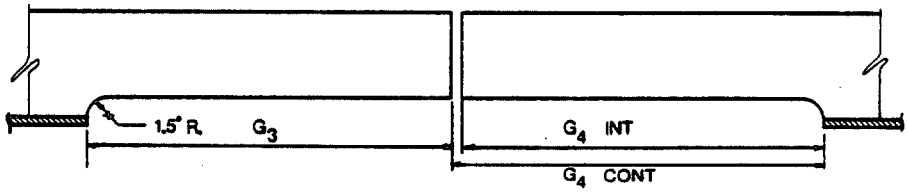
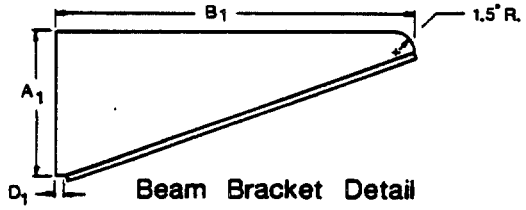
Note 4 on Figure 33



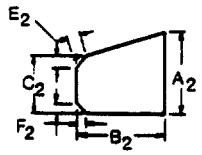
Key Diagram



Longitudinal Beam Detail



Beam Bracket Detail



Chock Detail

SH 12986

FIGURE 35. Intersections of longitudinal and deep transverse: Bracket cut from rolled shape, l/d > 22.

Component #1	Beam Bracket (Identical Both Sides)	
A_1	If $d_3<6"$ or $d_3>20"$	$A_1=d_3-t_{f3}+1.5"$
	If $6"\leq d_3\leq 20"$	$A_1=d_3-t_{f3}+2.5"$
	If $A_1+d_3+t_{f3}>d_5-t_{f5}$	Refer to Figure 34
B_1	If $2d_3>.125\ \ell_3$	$B_1=2d_3$
	If $2d_3\leq .125\ \ell_3$	$B_1=.125\ \ell_3$
D_1	Always	$.125"\leq D_1\leq .25"$
θ_1	Always	$\theta_1=\tan^{-1}[(A_1-1.5")/(B_1-D_1)]$
	If $\theta_1\geq 20°$	Refer to Figure 34
A_1'	Always	$A_1'=(A_1+(D_1+t_{f3}/\sin\theta_1)\tan\theta_1)\cos\theta_1$
	If $A_1'\leq d_3$	Cut bracket from section of ③.
	If $A_1'>d_3$	Bracket cannot be cut from section of ③. Use Figure 36 or cut bracket from section with equivalent t_w, t_f and w_f and $d > A_1'$.
Component #2	Chock Detail (Identical Both Sides)	
A_2	Always	$A_2=d_5-d_3-A_1-D_1\ \tan\theta_1-t_{f3}/\cos\theta_1+1.5"$
B_2	Always	$B_2=(w_{f5}-t_{w5}).5-.25"$
C_2	Always	$C_2=(A_2+B_2\ \tan\theta_1)$
E_2	Always	$E_2=t_{f3}\ \sin\theta_1+D_1/\cos\theta_1+.125"$
F_2	If $k_5-t_{f5}+.125">.5"$	$F_2=k_5-t_{f5}+.125"$
	If $k_5-t_{f5}+.125"\leq .5"$	$F_2=.5"$
T_2	Always	$T_2=t_{w3}$
Component #3	Longitudinal Beam (Molded Side)	
G_3	Always	$G_3=B_1$
Component #4		
G_4	If longitudinal is intercostal	$G_3=B_1$
	If longitudinal is continuous	$G_3=B_1+t_b$
Component #5	Transverse	
Q_5	Always	$Q_5=d_3-1.5"$
R_5	Always	$R_5=t_{w3}+.25"$
Component #6	Tangency Bracket (Identical Both Sides)	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7	Collar	
		Not required

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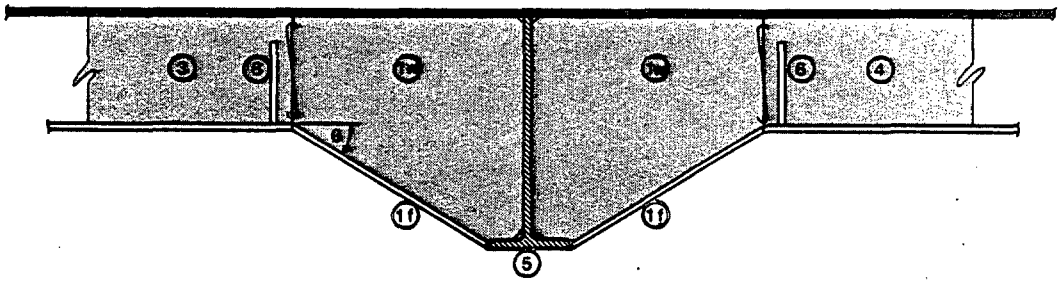
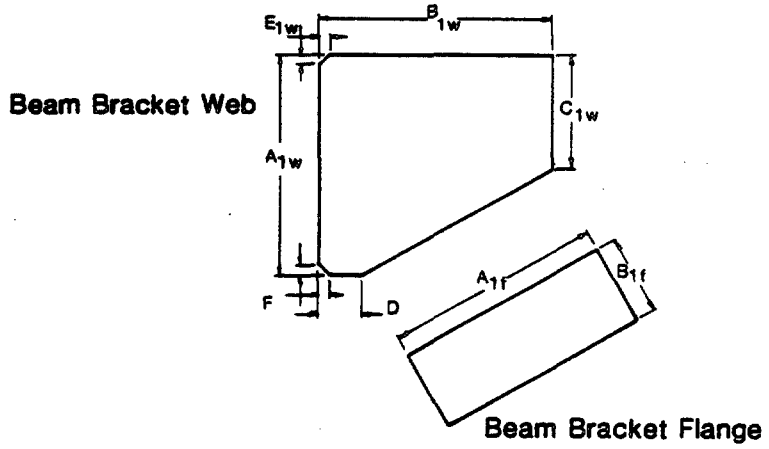
FIGURE 35. Intersections of longitudinal and deep transverse: Bracket cut from rolled shape, 1/d > 22. - Continued

Note 4 on Figure 33



Key Diagram



SH 12987

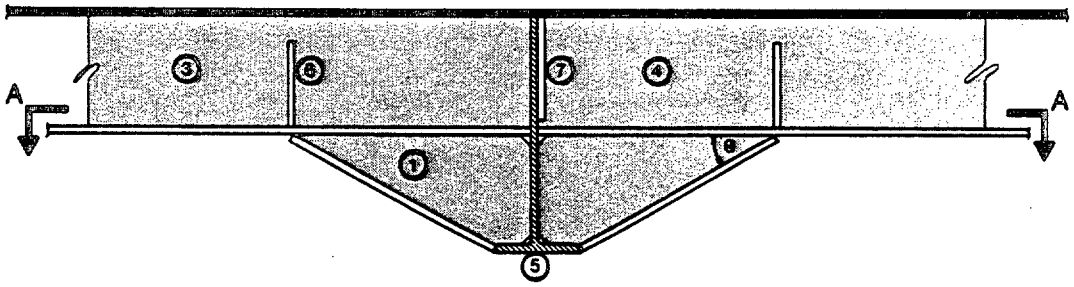
FIGURE 36. Intersections of longitudinal and deep transverse: Built-up, all l/d.

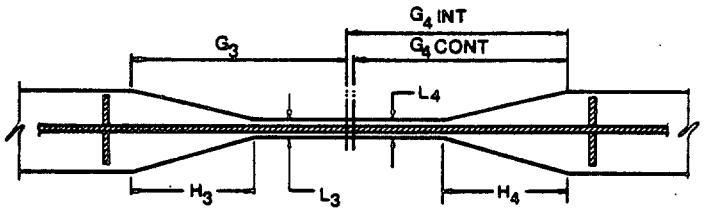
Component #1ω	Beam Bracket Web (Identical Both Sides)	
$A_{1\omega}$	If $d_3<6"$ or $d_3>20"$	$A_{1\omega}=2d_3-t_{\beta 3}$
	If $6"\leq d_3\leq 20"$	$A_{1\omega}=2d_3-t_{\beta 3}+1"$
	If $A_{1a}+1.5">d_5-t_{\beta 5}$	Refer to Figure 39
	If $A_{1a}+1.5"\leq d_5-t_{\beta 5}$	$A_{1\omega}=d_5-t_{\beta 5}$
$B_{1\omega}$	If $2d_3>.125\ \ell_3$	$B_{1\omega}=2d_3$
	If $2d_3\leq .125\ \ell_3$	$B_{1\omega}=.125\ \ell_3$
$C_{1\omega}$	Always	$C_{1\omega}=d_3-t_{\beta 3}$
$D_{1\omega}$	Always	$D_{1\omega}=(w_{\beta 5}-t_{w5}).5$
$E_{1\omega}$	If $t_{12}>t_{13}$ and $t_{13}>.5"$	$E_{1\omega}=t_{13}$
	If $t_{12}\leq t_{13}$ and $t_{12}>.5"$	$E_{1\omega}=t_{12}$
	If $t_{12}\leq .5"$ or $t_{13}\leq .5"$	$E_{1\omega}=.5"$
$F_{1\omega}$	If $k_5-t_{\beta 5}+.125">.5"$	$F_{1\omega}=k_5-t_{\beta 5}+.125"$
	If $k_5-t_{\beta 5}+.125"\leq .5"$	$F_{1\omega}=.5"$
$T_{1\omega}$	Always	$T_{1\omega}=t_{w3}$
	Note: Bracket cannot be continuous	
Component #1β	Beam Bracket Flange (Identical Both Sides)	
$A_{1\beta}$	Always	$A_{1\beta}=[(A_{1a}-C_{1a})^2+(B_{1a}-D_{1a})^2]^{1/2}$
$B_{1\beta}$	Always	$B_{1\beta}=w_{\beta 3}$
Component #2		
		Not required
Component #3		
		No detail required
Component #4	Longitudinal Beam (Opposite Side)	
		No detail required
Component #5	Transverse	
		No detail required
Component #6	Tangency Bracket (Identical Both Sides)	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.

SH 12987

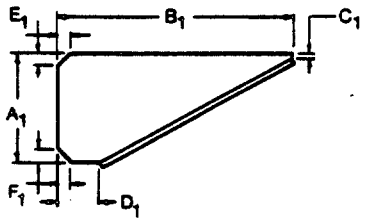
FIGURE 36. Intersections of longitudinal and deep transverse: Built-up, all l/d. - Continued

Note 3 on Figure 33





Section A-A



Beam Bracket Detail

SH 12988

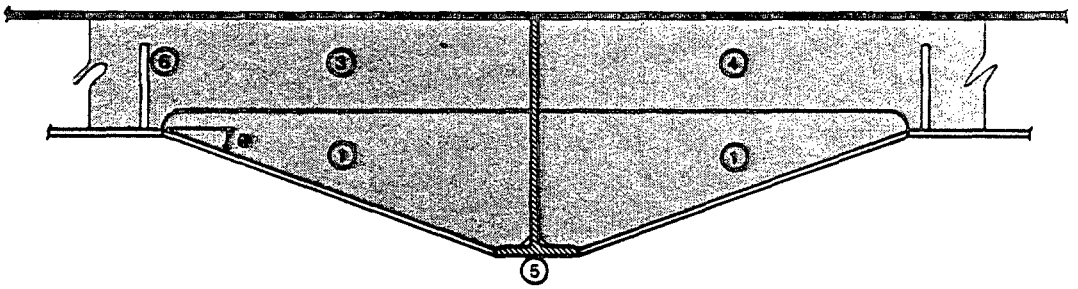
FIGURE 37. Intersections of longitudinal and shallow transverse: Bracket cut from rolled shape, $l/d < 26$.

Component #1	Beam Bracket (Identical Both Sides)	
A_1	If $d_3<6"$ or $d_3>20"$	$A_1=d_3-t_{f3}$
	If $6"\leq d_3\leq 20"$	$A_1=d_3-t_{f3}+1"$
	If $A_1+d_3+t_{f3}+1.5"<d_5-t_{f5}$	Refer to Figure 34
	If $A_1+d_3+t_{f3}+1.5">d_5-t_{f5}$	$A_1=d_5-t_{f5}-d_3$
B_1	If $2d_3>.125\ \ell_3$	$B_1=2d_3$
	If $2d_3\leq .125\ \ell_3$	$B_1=.125\ \ell_3$
C_1	Always	$.125"\leq C_1\leq .25"$
D_1	Always	$.125"+.5(w_{f5}-t_{w5})\leq D_1\leq .25"+.5(w_{f5}-t_{w5})$
Θ_1	Always	$\Theta_1=\tan^{-1}[(A_1-C_1)/(B_1-D_1)]$
	If $\Theta_1<20°$	Refer to Figure 38
E_1	If $t_{f3}>t_{w5}$ and $t_{w5}>.5"$	$E_1=t_{w5}$
	If $t_{f3}\leq t_{w5}$ and $t_{f3}>.5"$	$E_1=t_{f3}$
	If $t_{f3}\leq .5"$ or $t_{w5}\leq .5"$	$E_1=.5"$
F_1	If $k_5-t_{f5}+.125">.5"$	$F_1=k_5-t_{f5}+.125"$
	If $k_5-t_{f5}+.125"\leq .5"$	$F_1=.5"$
A_1'	Always	$A_1'=(A_1-E_1+(D_1+t_{f3}/\sin\Theta_1)\tan\Theta_1)\cos\Theta_1$
B_1'	Always	$B_1'=(B_1-E_1+(C_1+t_{f3}/\sin\Theta_1)/(\tan\Theta_1))\cos\Theta_1$
	If $A_1'\leq d_3$ and $B_1'\leq d_3$	Cut bracket from section of ③.
	If $A_1'>d_3$ or $B_1'>d_3$	Bracket cannot be cut from section of ③. Use Figure 39 or cut bracket from section with equivalent t_w, t_f and w_f and $d\geq A_1'$ and $d\geq B_1'$.
Component #2	Bracket Insert	
		Not required
Component #3	Longitudinal Beam (Molded Side)	
G_3	Always	$G_3=B_1-1.5"$
H_3	If $G_3<1.5\ w_{f3}$	$H_3=G_3$
	If $G_3\geq 1.5\ w_{f3}$	$H_3=1.5\ w_{f3}$
L_3	Always	$L_3=3t_{w3}+.25"$
Component #4	Longitudinal Beam (Opposite Side)	
G_4	If longitudinal is continuous	$G_4=B_1-1.5"+t_b$
	If longitudinal is intercostal	$G_4=B_1-1.5"$
H_4	If $G_4<1.5\ w_{f3}$	$H_4=G_4$
	If $G_4\geq 1.5\ w_{f3}$	$H_4=1.5\ w_{f3}$
L_4	Always	$L_4=3t_{w3}+.25"$
Component #5	Transverse	
	If longitudinal is intercostal	No detail required
	If longitudinal is continuous	$Q_5=d_3+.125"$
		$R_5=w_{f3}+1.5"$
Component #6	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7	Collar	
	If longitudinal is intercostal	No detail required
	If longitudinal is continuous and:	
	Shear loading is high	Select flush or lapped collar from Table 13 or 14. Piercing member = ③.
	Shear loading is not high	Select lug collar from Table 12. Piercing member = ③.

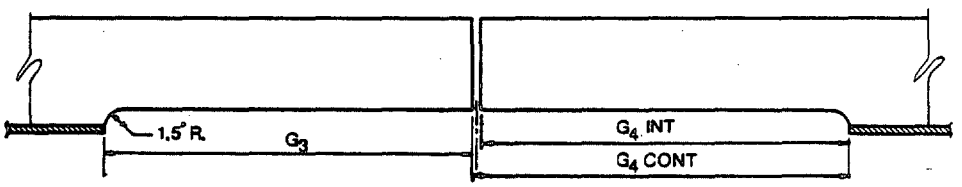
SH 12988

FIGURE 37. Intersections of longitudinal and shallow transverse: Bracket cut from rolled shape, 1/d < 26. - Continued

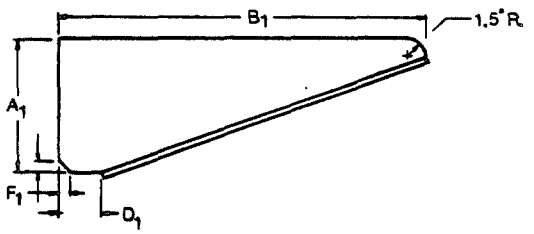
Note 4 on Figure 33



Key Diagram



Longitudinal Beam Detail



Beam Bracket Detail

SH 12989

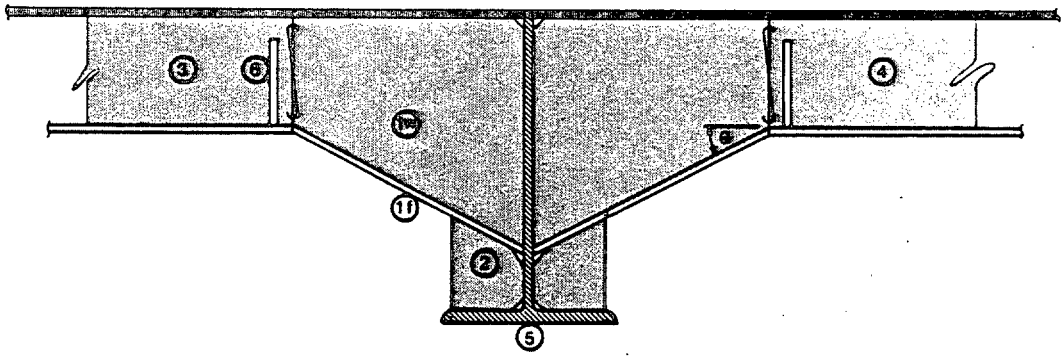
FIGURE 38. Intersections of longitudinal and shallow transverse: Bracket cut from rolled shape, 1/d > 22.

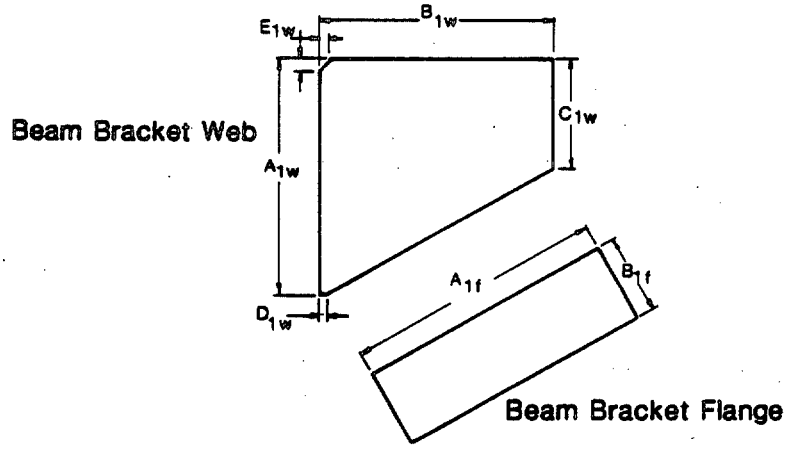
Component #1	Beam Bracket (Identical Both Sides)	
A_1	If $d_3<6"$ or $d_3>20"$	$A_1=d_3-t_{f3}$
	If $6"\leq d_3\leq 20"$	$A_1=d_3-t_{f3}+1"$
	If $A_1+d_3+t_{f3}+1.5"<d_5-t_{f5}$	Refer to Figure 35
	If $A_1+d_3+t_{f3}+1.5"\geq d_5-t_{f5}$	$A_1=d_5-t_{f5}-d_3$
B_1	If $2d_3>.125\ \ell_3$	$B_1=2d_3$
	If $2d_3\leq .125\ \ell_3$	$B_1=.125\ \ell_3$
D_1	Always	$.5(w_{f5}-t_{w5})+.125"\leq D_1\leq .5(w_{f5}-t_{w5})+.25"$
Θ_1	Always	$\Theta_1=\tan^{-1}[(A_1-1.5")/(B_1-D_1)]$
	If $\Theta_1>20°$	Refer to Figure 37
F_1	If $k_5-t_{f5}+.125">.5"$	$F_1=k_5-t_f+.125"$
	If $k_5-t_{f5}+.125"\leq .5"$	$F_1=.5"$
A_1'	Always	$A_1'=(A_1+(D_1+t_{f3}/\sin\Theta_1)\tan\Theta_1)\cos\Theta_1$
B_1'	Always	$B_1'=(B_1+(C_1+t_{f3}/\sin\Theta_1)/(\tan\Theta_1))\cos\Theta_1$
	If $A_1'\leq d_3$ and $B_1'\leq d_3$	Cut bracket from section of ③.
	If $A_1'\geq d_3$ or $B_1'\geq d_3$	Bracket cannot be cut from section of ③. Use Figure 39 or cut bracket from section with equivalent t_w, t_f and w_f and $d\geq A_1'$ and $d\geq B_1'$.
Component #2	Bracket Insert	
		Not required
Component #3	Longitudinal Beam (Molded Side)	
G_3	Always	$G_3=B_1$
Component #4	Longitudinal Beam (Opposite Side)	
G_4	If longitudinal is continuous	$G_4=B_1+t_b$
	If longitudinal is intercostal	$G_4=B_1$
Component #5	Transverse	
	If longitudinal is continuous	$Q_5=d_3-1.375"$ $R_5=t_{w3}+.25"$
	If longitudinal is intercostal	No detail required
Component #6	Tangency Bracket (Identical Both Sides)	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7	Collar	
		Not required

SH 12989

FIGURE 38. Intersections of longitudinal and shallow transverse: Bracket cut from rolled shape, 1/d > 22. - Continued

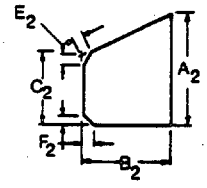
Note 4 on Figure 33





Beam Bracket Web

Beam Bracket Flange



Chock Detail

SH 12990

FIGURE 39. Intersections of longitudinal and shallow transverse, built-up.

Component 1w	Beam Bracket Web (Identical Both Sides)	
A_{1w}	If $d_3<6"$ or $d_3>20"$	$A_{1w}=2d_3-t_{f3}$
	If $6"\leq d_3\leq 20"$	$A_{1w}=2d_3-t_{f3}+1"$
	If $A_{1a}+t_{f3}+1.5>d_5-t_{f5}$	Refer to Figure 36
B_{1w}	If $2d_3>.125\ \ell_3$	$B_{1w}=2d_3$
	If $2d_3\leq .125\ \ell_3$	$B_{1w}=.125\ \ell_3$
C_{1w}	Always	$C_{1w}=d_3-t_{f3}$
D_{1w}	Always	$.125"\leq D_{1a}\leq .25"$
E_{1w}	If $t_{12}>t_{13}$ and $t_{13}>.5"$	$E_{1w}=t_{13}$
	If $t_{12}\leq t_{13}$ and $t_{12}>.5"$	$E_{1w}=t_{12}$
	If $t_{12}\leq .5"$ or $t_{13}\leq .5"$	$E_{1w}=.5"$
T_{1w}	Always	$T_{1w}=t_{w3}$
θ	Always	$\theta=\tan^{-1}(A_{1a}-C_{1a})/(B_{1a}-D_{1a})$
	Note: Bracket cannot be continuous	
Component #1f	Beam Bracket Flange (Identical Both Sides)	
A_{1f}	Always	$A_{1f}=((A_{1a}-C_{1a})^2+(B_{1a}-D_{1a})^2)^{1/2}$
B_{1f}	Always	$B_{1f}=w_{f3}$
T_{1f}	Always	$T_{1f}=t_{f3}$
Component #2	Chock Detail (Identical Both Sides)	
A_2	Always	$A_2=d_5-d_3-A_1-D_1\tan\theta_1-t_{f3}/\cos\theta_1$
B_2	Always	$B_2=(w_{f5}-t_{w5}).5-.25"$
C_2	Always	$C_2=A_2+B_2\tan\theta_1$
E_2	Always	$E_2=t_{f3}\sin\theta_1+D_1/\cos\theta_1+.125"$
F_2	If $k_5-t_{f5}+.125">.5"$	$F_2=k_5-t_{f5}+.125"$
	If $k_5-t_{f5}+.125"\leq .5"$	$F_2=.5"$
T_2	Always	$T_2=t_{w3}$
Component #3	Longitudinal (Molded Side)	
		No detail required
Component #4	Longitudinal (Opposite Side)	
		No detail required
Component #5	Transverse	
		No detail required
Component #6	Tangency Bracket (Identical Both Sides)	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ③.
Component #7		
		Not required

SH 12990

FIGURE 39. Intersections of longitudinal and shallow transverse, built-up. - Continued

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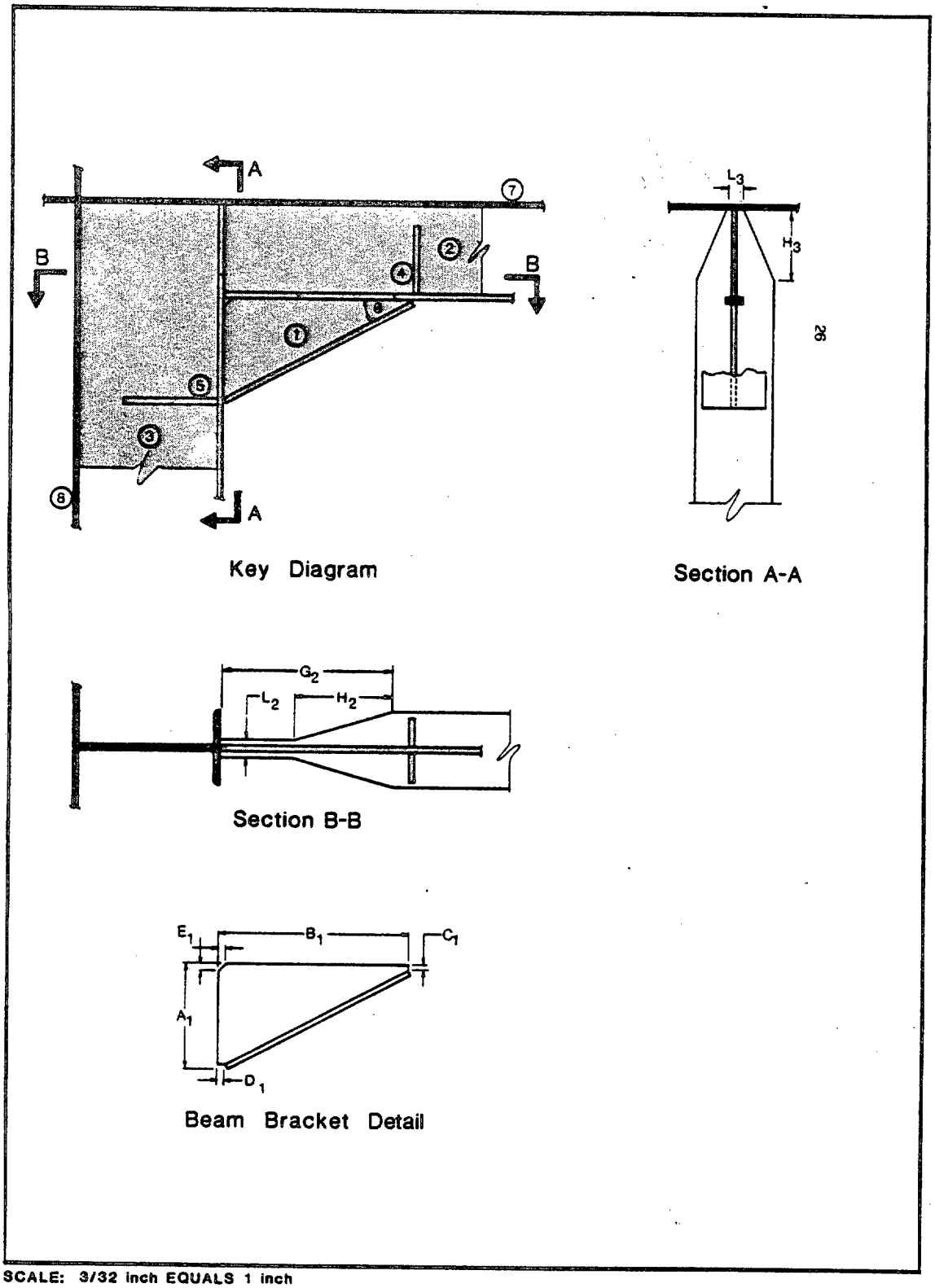
BRACKET CONSTRUCTION		l/d RATIO		FIGURE NUMBER
CUT FROM ROLLED SHAPE	BUILT UP FROM PLATE	l/d < 26	l/d > 22	
●		●		41
●			●	42
	●	●	●	43

l/d RATIO is the ratio of length to depth of longitudinal

Overlap of l/d RATIO is intentional

SH 12991

FIGURE 40. Applicability index for corner brackets.



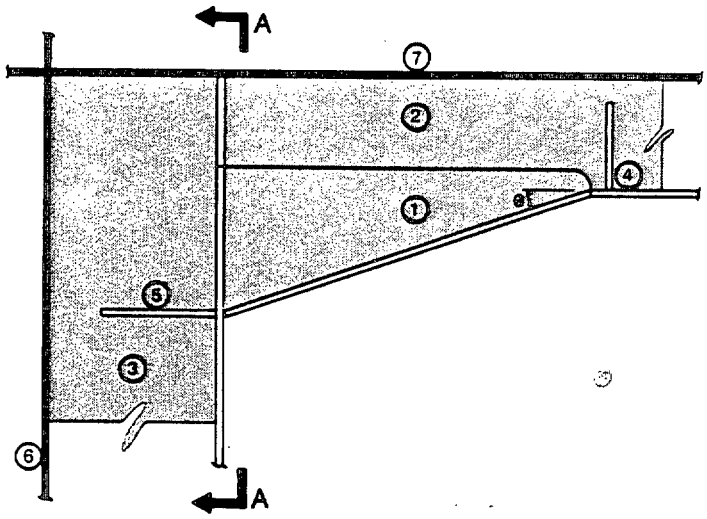
SH 12992

FIGURE 41. Corner bracket: Bracket cut from rolled shape, 1/d < 26.

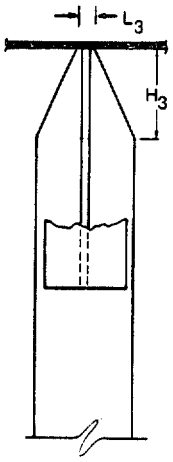
Component #1	Beam Bracket	
A_1	If $d_2<6"$ or $d_2>20"$	$A_1=d_2-t_{f2}$
	If $6"\leq d_2\leq 20"$	$A_1=d_2-t_{f2}+1"$
B_1	If $2d_3>.125\ \ell_2$	$B_2=2d_2$
	If $2d_2\leq .125\ \ell_2$	$B_2=.125\ \ell_2$
C_1	Always	$.125"\leq C_1\leq .25"$
D_1	Always	$.125"\leq D_1\leq .25"$
E_1	If $t_{f2}>t_{f3}$ and $t_{f3}>.5"$	$E_1=t_{f3}$
	If $t_{f2}\leq t_{f3}$ and $t_{f2}>.5"$	$E_1=t_{f2}$
	If $t_{f2}\leq .5"$ or $t_{f3}\leq .5"$	$E_1=.5"$
Θ_1	Always	$\Theta_1=\tan^{-1}((A_1-C_1)/(B_1-D_1))$
	If $\Theta_1<20°$	Refer to Figure 42
A_1'	Always	$A_1'=(A_1-E_1+(D_1+t_{f2}/\sin\Theta_1)\tan\Theta_1)\cos\Theta_1$
B_1'	Always	$B_1'=(B_1-E_1+(C_1+t_{f2}/\cos\Theta_1)/(\tan\Theta_1))\sin\Theta_1$
	If $A_1'\leq d_2$ and $B_1'\leq d_2$	Cut bracket from section of ②.
	If $A_1'>d_2$ or $B_1'>d_2$	Bracket cannot be cut from section of ②. Use Figure 39 or cut bracket from section with equivalent t_w, t_f and w_f and $d\geq A_1'$ and $d\geq B_1'$.
Component #2	Shallower Member	
G_2	Always	$G_2=B_1-1.5"$
H_2	If $G_2<1.5\ w_{f2}$	$H_2=G_2$
	If $G_2\geq 1.5\ w_{f2}$	$H_2=1.5\ w_{f2}$
L_3	Always	$L_3=3t_{w2}+.25"$
Component #3	Deeper Member	
G_3	Always	$G_3=d_2-1.5"$
H_3	If $G_3<1.5\ w_{f3}$	$H_3=G_3$
	If $G_3\geq 1.5\ w_{f3}$	$H_3=1.5\ w_{f3}$
L_3	Always	$L_3=3t_{w3}+.25"$
Component #4	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ②.
Component #5	Toe Bracket	
	Always	Select toe bracket from Table 6. Member to be bracketed = ②. Thickness of backing structure = t_{w3}. Read corresponding dimensions from Table 7.
	If $a_5>d_3-t_{w3}$ or $b_5>.5(w_{f3}-t_{w3})$ or $c_5\leq k_3-t_{f3}$	Redesign toe bracket to suit application.

SH 12992

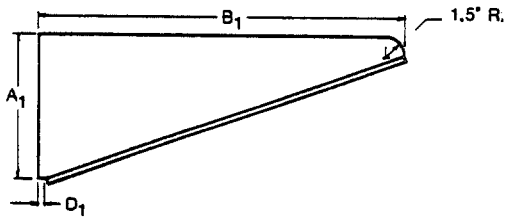
FIGURE 41. Corner bracket: Bracket cut from rolled shape, 1/d < 26. - Continued



Key Diagram



Section A-A



Beam Bracket Detail

SH 12993

FIGURE 42. Corner bracket: Bracket cut from rolled shape, 1/d > 22.

Component #1	Beam Bracket	
A_1	If $d_2<6"$ or $d_2>20"$	$A_1=d_2-t_{f2}+1.5"$
	If $6"\leq d_2\leq 20"$	$A_1=d_2-t_{f2}+2.5"$
B_1	If $2d_2>.125\ \ell_2$	$B_1=2d_2$
	If $2d_2\leq .125\ \ell_2$	$B_1=.125\ \ell_2$
D_1	Always	$.125"\leq D_1\leq .25"$
Θ_1	Always	$\Theta_1=\tan^{-1}[(A_1-1.5")/(B_1-D_1)]$
	If $\Theta_1>20°$	Refer to Figure 41
A_1'	Always	$A_1'=(A_1+(D_1+t_{f2}/\sin\Theta_1)\tan\Theta_1)\cos\Theta_1$
	If $A_1'\leq d_2$	Cut bracket from section of ②.
	If $A_1'>d_2$	Bracket cannot be cut from section of ②. Use Figure 43 or cut bracket from section with equivalent t_w, t_f and w_f and $d\geq A_1'$.
Component #2	Shallower Member	
G_2	Always	$G_2=B_1$
Component #3		
G_3	Always	$G_3=d_2-1.5"$
H_3	If $G_3<1.5\ w_{f3}$	$H_3=G_3$
	If $G_3\geq 1.5\ w_{f3}$	$H_3=1.5\ w_{f3}$
L_3	Always	$L_3=3t_{w3}+.25"$
Component #4	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ②.
Component #5	Toe Bracket	
	Always	Select toe bracket from Table 6. Member to be bracketed = ②. Thickness of backing structure = t_{w3}. Read corresponding dimensions from Table 7.
	If $a_5>d_3-t_{w3}$ or $b_5>.5(w_{f3}-t_{w3})$ or $c_5\leq k_3-t_{f3}$	Redesign toe bracket to suit application.

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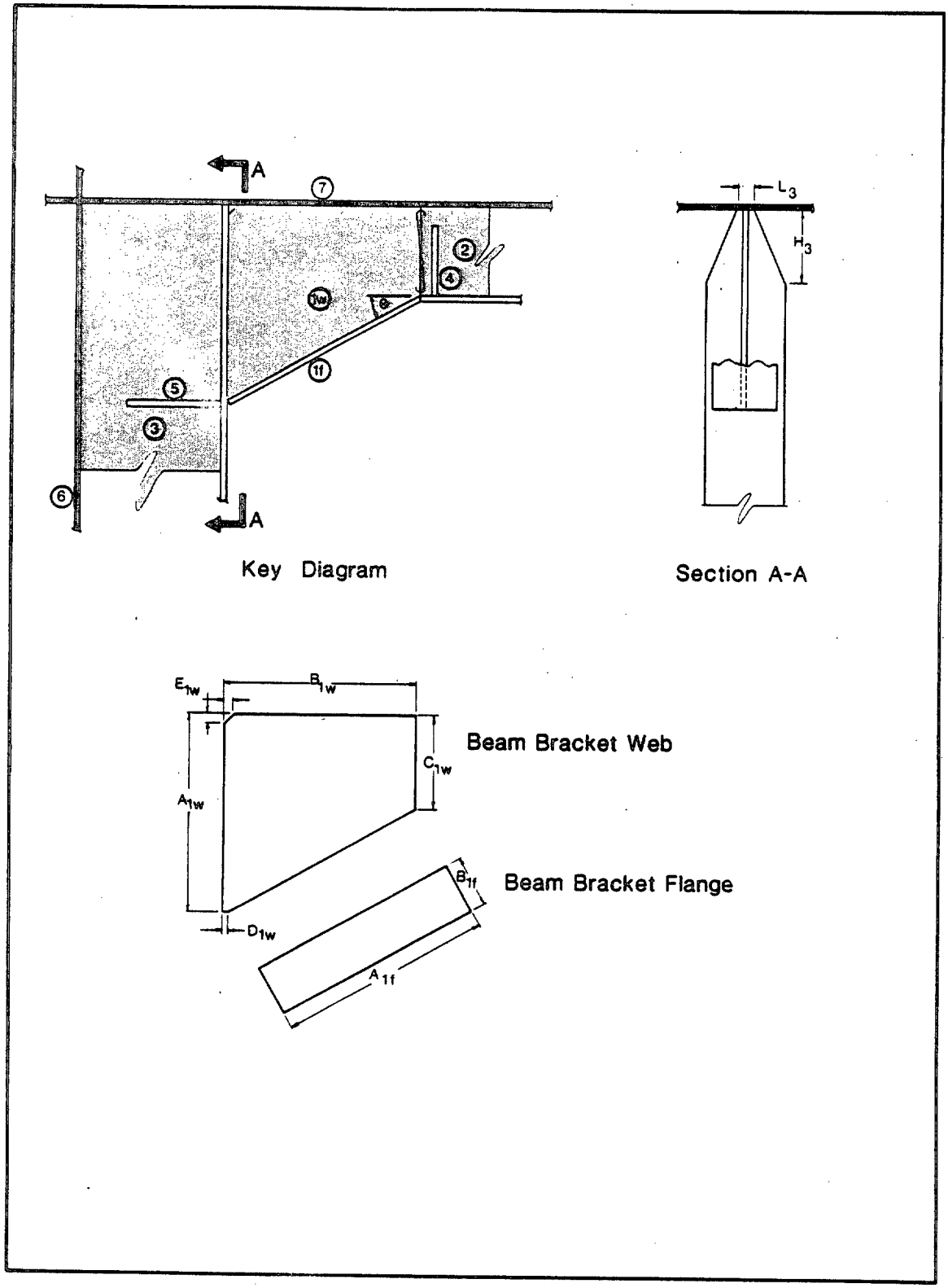
FIGURE 42. Corner bracket: Bracket cut from rolled shape, 1/d > 22. - Continued



SH 12994

FIGURE 43. Corner bracket, built up.

Component #1w	Beam Bracket Web	
A_{1w}	If $d_2<6"$ or $d_2>20"$	$A_{1w}=d_2-t_{f2}$
	If $6"\leq d_2\leq 20"$	$A_{1w}=d_2-t_{f2}+1"$
B_{1w}	If $2d_2>.125\ \ell_2$	$B_{1w}=2d_2$
	If $2d_2\leq .125\ \ell_2$	$B_{1w}=.125\ \ell_2$
C_{1w}	Always	$C_{1w}=d_2-t_{f2}$
D_{1w}	Always	$.125"\leq D_1\leq .25"$
E_{1w}	If $t_7>t_{f3}$ and $t_{f3}>.5"$	$E_{1w}=t_{f3}$
	If $t_7<t_{f3}$ and $t_7>.5"$	$E_{1w}=t_7$
	If $t_7\leq .5"$ or $t_{f3}\leq .5"$	$E_{1w}=.5"$
T_{1w}	Always	$T_{1w}=t_{w2}$
Component #1f	Beam Bracket Flange	
A_{1f}	Always	$A_{1f}=[(A_1-C_1)^2+(B_1-D_1)^2]^{\frac{1}{2}}$
B_{1f}	Always	$B_{1f}=w_{f2}$
T_{1f}	Always	$T_{1f}=t_f$
Component #2	Shallower Member	
		No detail required
Component #3	Deeper Member	
G_3	Always	$G_3=d_2-1.5"$
H_3	If $G_3<1.5\ w_{f3}$	$H_3=G_3$
	If $G_3\geq 1.5\ w_{f3}$	$H_3=1.5\ w_{f3}$
L_3	Always	$L_3=3t_{w3}+.25"$
Component #4	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = ②.
Component #5	Toe Bracket	
	Always	Select toe bracket from Table 6. Member to be bracketed = ②. Thickness of backing structure = t_{w3}. Read corresponding dimensions from Table 7.
	If $a_5>d_3-t_{w3}$ or $b_5>.5(w_{f3}-t_{w3})$ or $c_5<k_3-t_{f3}$	Redesign toe bracket to suit application.

SH 12994

FIGURE 43. Corner bracket, built up. - Continued

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STANCHION MEMBER			TYPE OF CONNECTION		SUPPORTED MEMBERS				
I BEAM	LIGHT TUBE	HEAVY TUBE	TERMINATION	ABOVE/ BELOW	SINGLE BEAM	INTERSECTING BEAMS		FIGURE NUMBER	NOTES
						SAME HT	DIFF HT		
●			●			●		45	
●			●				●	46	Note 1
●				●		●		47	
●				●			●	48	
	●		●		●			49	
	●		●			●		50	
	●		●				●	51	
		●	●			●		52	
		●	●				●	53	

NOTE:
1. Flange snipes are not used on primary structure.

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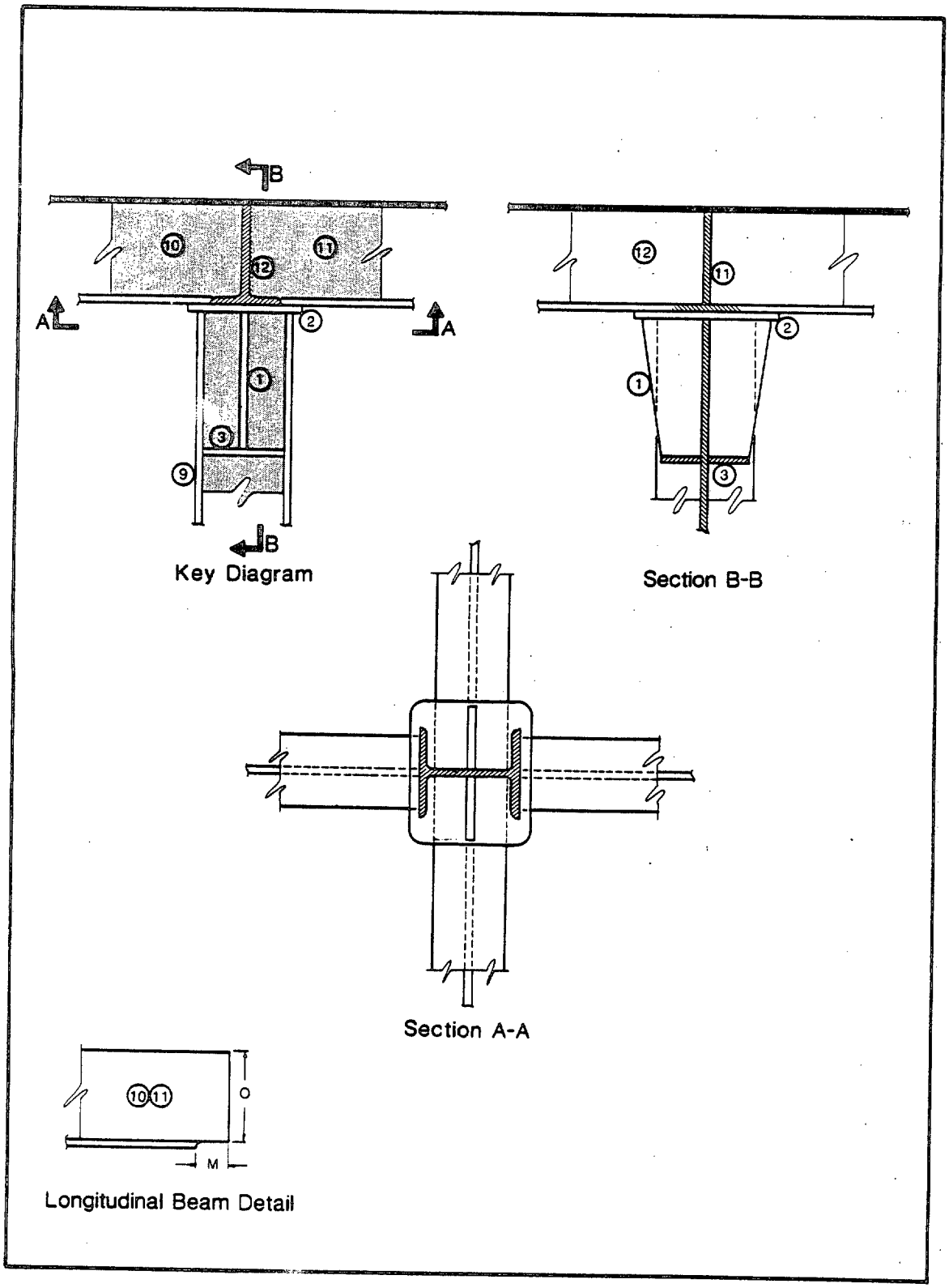
FIGURE 44. Applicability index for stanchion details.



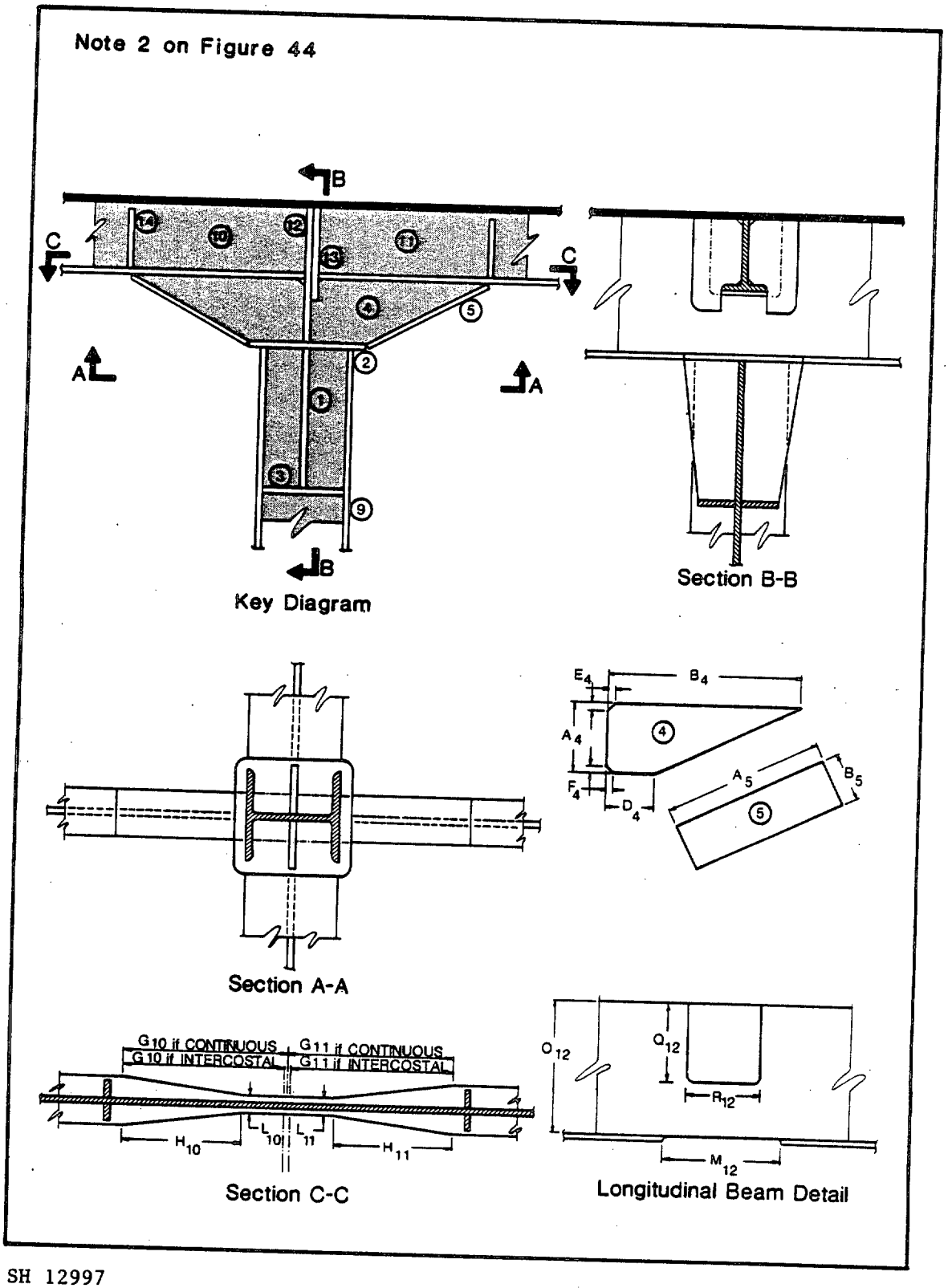
SH 12996

FIGURE 45. Terminating I-beam stanchion: Supported members equal height.

Component #1	Stanchion Bracket	
	Always	Select I-beam stanchion bracket from Table 20. I-beam stanchion member = ⑨.
Component #2	Sole/Cap Plate	
	Always	Select I-beam stanchion sole/cap plate from Table 20. I-beam stanchion member = ⑨.
Component #3	I-Beam Stanchion Bracket Chock	
	Always	Select I-beam stanchion bracket chock from Table 20. I-beam stanchion member = ⑨.
Components #4, 5, 6, 7, 8, 13 and 14		
		Not required
Components #9 and 12		
		No detail required
Component #10	Intercostal Beam	
M_{10} O_{10}	Always Always	$M_{10}=(w_{f12}-t_{w12}).5$ $O_{10}=d_{12}-t_{f12}$
Component #11	Intercostal Beam	
M_{11} O_{11}	Always Always	$M_{11}=(w_{f12}-t_{w12}).5$ $O_{11}=d_{12}-t_{f12}$

SH 12996

FIGURE 45. Terminating I-beam stanchion: Supported members equal height. - Continued



SH 12997

FIGURE 46. Terminating I-beam stanchion: Supported members unequal height.

Component #1	Stanchion Bracket	
	Always	Select I-beam stanchion bracket from Table 20. I-beam stanchion member = ⑨.
Component #2	Sole/Cap Plate	
	Always	Select I-beam stanchion sole/cap plate from Table 20. I-beam stanchion member = ⑨.
Component #3	I-Beam Stanchion Bracket Chock	
	Always	Select I-beam stanchion bracket chock from Table 20. I-beam stanchion member = ⑨.
Component #4	Beam Bracket Web (Identical Both Sides)	
A_4	Always	$A_4=d_{12}-d_{10}-t_{\delta 12}$
B_4	If $2d_{10}>.125\ \ell_{10}$	$B_4=2d_{10}$
	If $2d_{10}\leq .125\ \ell_{10}$	$B_4=.125\ \ell_{10}$
	If $B_4<(b_2-t_{w12}).5+A_4$	$B_4=.5(b_2-t_{w12})+A_4$
D_4	Always	$D_4=.5(b_2-t_{w12})$
E_4	If $t_{w12}>t_{\delta 10}$ and $t_{\delta 10}>.5"$	$E_4=t_{\delta 10}$
	If $t_{w12}\leq t_{\delta 10}$ and $t_{w12}>.5$	$E_4=t_{w12}$
	If $t_{w12}\leq .5$ or $t_{\delta 10}\leq .5"$	$E_4=.5"$
F_4	If $t_{w12}>t_2$ and $t_2>.5"$	$F_4=t_2$
	If $t_{w12}\leq t_2$ and $t_{w12}>.5"$	$F_4=t_{w12}$
	If $t_{w12}\leq .5"$ or $t_2\leq .5"$	$F_4=.5"$
T_4	Always	$T_4=t_{w10}$
Component #5	Beam Bracket Flange (Identical Both Sides)	
A_5	Always	$A_5=((A_4{}^2)+(B_4-D_4)^2)^{\frac{1}{2}}$
B_5	Always	$B_5=w_\delta$
Components #6, 7 and 8		
		Not required
Component #9	I-Beam	
		No detail required
Component #10	Shallower Member (Molded Side)	
Optional G_{10}	Always	$G_{10}=B_4-1.5"$
Optional H_{10}	If $1.5\ w_{\delta 10}>G_8$	$H_{10}=G_{10}$
	If $1.5\ w_{\delta 10}\leq G_8$	$H_{10}=1.5\ w_{\delta 10}$
Optional L_{10}	Always	$L_{10}=3t_{w10}+.25"$

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FIGURE 46. Terminating I-beam stanchion: Supported members unequal height. - Continued

Component #11		Shallower Member (Opposite Side)	
Optional	G_{11}	If shallower member is intercostal	$G_{11}=B_4-1.5"$
		If shallower member is continuous	$G_{11}=B_4+t_{w11}-1.5"$
Optional	H_{11}	If $1.5\ w_{f11}>G_{11}$	$H_{11}=G_{11}$
		If $1.5\ w_{f11}\leq G_{11}$	$H_{11}=1.5\ w_{f11}$
Optional	L_{11}	Always	$L_{11}=3t_{w11}+.25"$
Component #12		Deeper Member	
	M_{12}	Always	$M_{12}=a_2$
	O_{12}	Always	$O_{12}=d_{12}-t_2$

SH 12997

FIGURE 46. Terminating I-beam stanchion: Supported members unequal height. - Continued

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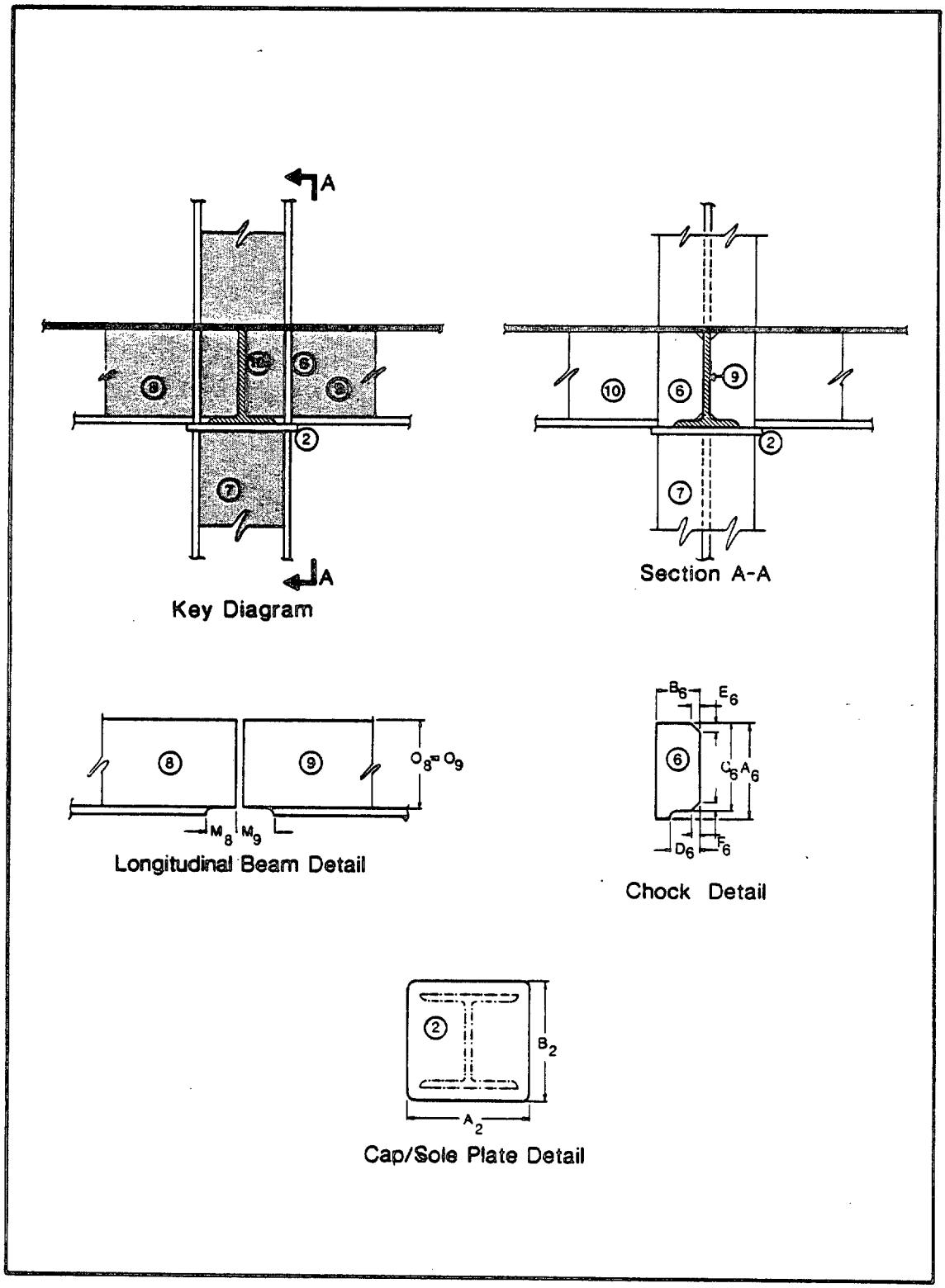


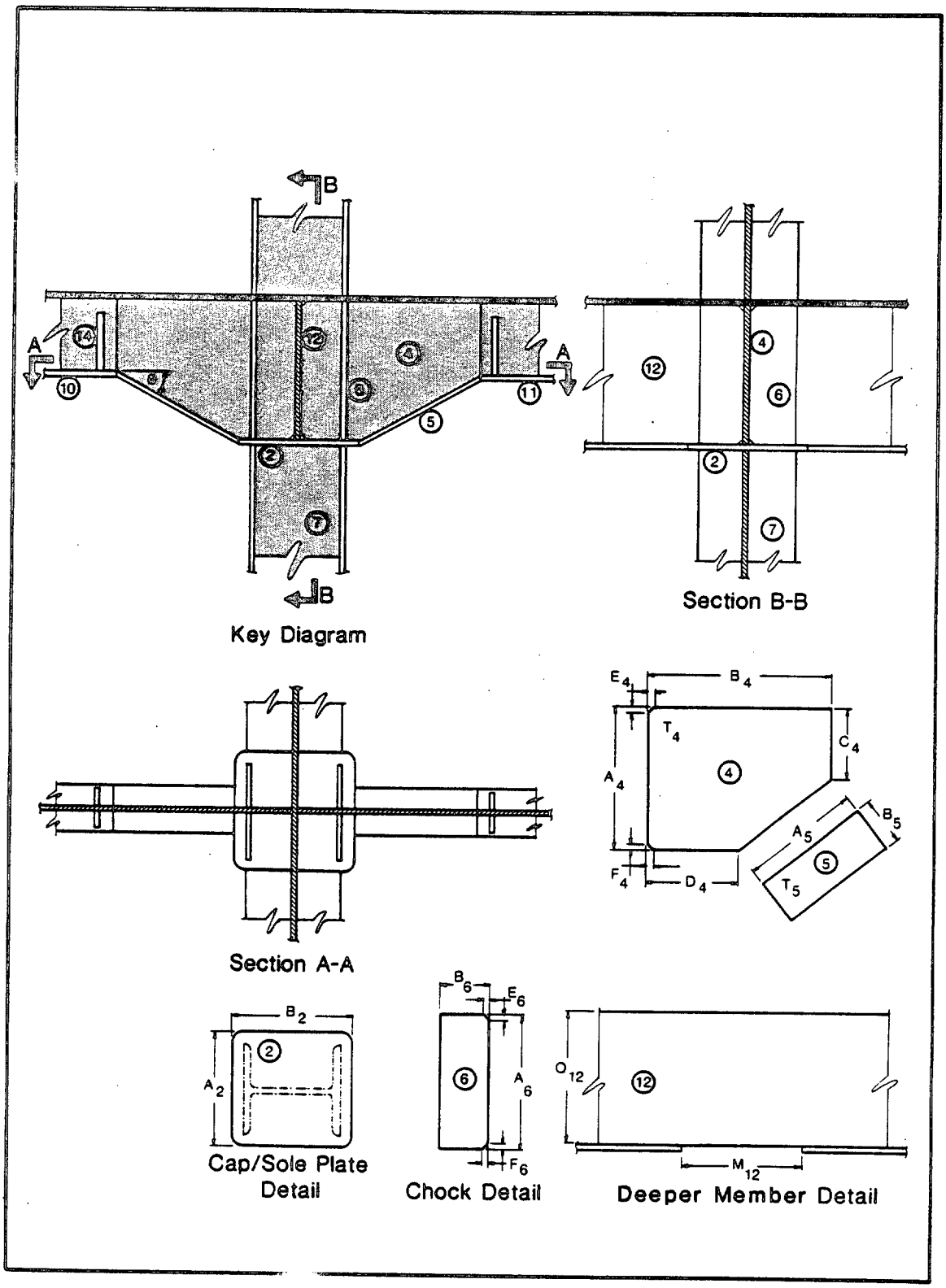
SH 12998

FIGURE 47. I-beam stanchion, above and below: Supported members equal height.

Component #1	Beam Bracket	
		Not required
Component #2	Cap/Sole Plate	
A_2	Always	$A_2=w_{f7}+1"$
B_2	Always	$B_2=d_7+t_{f7}+.5"$
T_2	If $t_{f7}>.5"$	$T_2=t_{f7}$
	If $t_{f7}\leq.5"$	$T_2=.5"$
Components #3, 4 and 5		
		Not required
Component #6	Chock Detail	
	If $w_{f10}\geq d_7-2t_{f7}$	Select in-line bracket from Table 8. Backing member = (10). Thickness of supported flange = t_{f7}.
	If $w_{f10}<d_7-2t_{f7}$:	
A_6	Always	$A_6=d_8$
B_6	Always	$B_6=.5(w_{f7}-t_{w8})$
C_6	Always	$C_6=d_8-t_{f8}$
D_6	Always	$D_6=.5(w_{f8}-t_{w8})$
E_6	If $t>t_{w8}$ and $t_{w8}>.5"$	$E_6=t_{w8}$
	If $t\leq t_{w8}$ and $t>.5"$	$E_6=t$
	If $t\leq.5"$ or $t_{w8}\leq.5"$	$E_6=.5"$
F_6	Always	$F_6=k_8-t_{f8}$
T_6	Always	$T_6=t_{f7}$
Component #7	I-Beam Stanchion	
		No detail required
Component #8	Intercostal Member	
M_8	Always	$M_8=w_{f8}-t_{w8}$
O_8	Always	$O_8=d_8-t_{f8}$
Component #9	Intercostal Member	
M_9	Always	$M_9=w_{f9}-t_{w9}$
O_9	Always	$O_9=d_9-t_{f9}$
Component #10	Continuous Member	
		No detail required

SH 12998

FIGURE 47. I-beam stanchion, above and below: Supported members equal height. - Continued



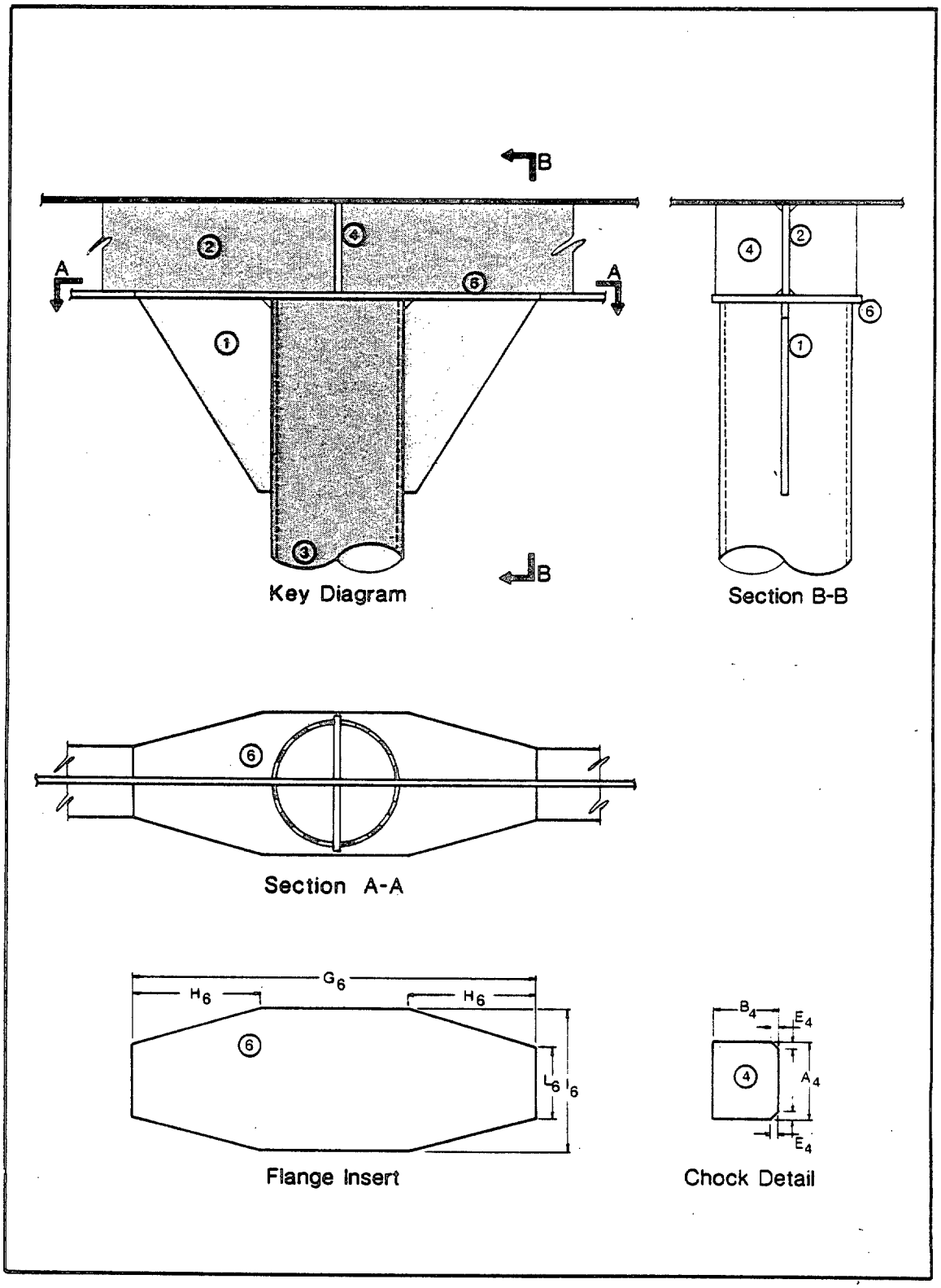
SH 12999

FIGURE 48. I-beam stanchion, above and below: Supported members unequal height.

Component #1	Stanchion Bracket	
		Not required
Component #2		
A_2	Always	$A_2=w_{\S7}+1"$
B_2	Always	$B_2=d_9+t_{\S9}+.5"$
T_2	If $t_{\S7}>.5"$	$T_2=t_{\S7}$
	If $t_{\S7}\leq.5"$	$T_2=.5"$
Component #3		
		Not required
Component #4	Beam Bracket Web (Identical Both Sides)	
A_4	Always	$A_4=d_{12}-t_{\S12}$
B_4	If $2d_{10}>.125\ \ell_{10}$	$B_4=2d_{10}$
	If $2d_{10}\leq.125\ \ell_{10}$	$B_4=.125\ \ell_{10}$
	If $B_4<(B_2-t_{w12}).5+A_4-d_{10}+t_{\S10}$	$B_4=.5(B_2-t_{w12})+A_4-d_{10}+t_{\S10}$
C_4	Always	$C_4=d_{10}-t_{\S10}$
D_4	Always	$D_4=.5(B_2-t_{w12})$
E_4	If $t_d>t_{w12}$ and $t_{w12}>.5"$	$E_4=t_{w12}$
	If $t_d\leq t_{w12}$ and $t_d>.5"$	$E_4=t_d$
	If $t_d\leq.5"$ or $t_{w12}\leq.5"$	$E_4=.5"$
F_4	If $t_{w12}>T_2$	$F_4=T_2$
	If $t_{w12}\leq T_2$ and $t_{w12}>.5"$	$F_4=t_{w12}$
	If $t_{w12}\leq.5"$	$F_4=.5"$
T_4	Always	$T_4=t_{w10}$
Component #5	Beam Bracket Flange (Identical Both Sides)	
A_5	Always	$A_5=((A_4-C_4)^2+(B_4-D_4)^2)^{1/2}$
B_5	Always	$B_5=w_{\S4}$
T_5	Always	$T_5=t_{\S4}$
Component #6	Chock Detail	
A_6	Always	$A_6=d_{12}-t_{\S12}$
B_6	Always	$B_5=.5(w_{\S9}-T_4)$
E_6	If $T_4>t_d$ and $t_d>.5"$	$E_6=.5"$
	If $T_4\leq t_d$ and $T_4>.5"$	$E_6=T_4$
	If $T_4\leq.5"$ or $t_d\leq.5"$	$E_6=.5"$
F_6	If $T_4>T_2$	$F_6=T_2$
	If $T_4\leq T_2$ and $T_4>.5"$	$F_6=T_4$
	If $T_4\leq.5"$	$F_6=.5"$
T_6	Always	$T_6=t_{\S7}$
Components #9, 10 and 11		
		No detail required
Component #12	Deeper Member	
M_{12}	Always	$M_{12}=A_2$
O_{12}	Always	$O_{12}=d_{12}-T_2$
Component #14	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = (10).

SH 12999

FIGURE 48. I-beam stanchion, above and below: Supported members unequal height. - Continued



SH 13000

FIGURE 49. Light-tube stanchion: Supporting single beam.

Component #1	Stanchion Bracket	
	Always	Select light tube stanchion bracket from Table 24. Nominal size of tube stanchion = ⑨.
Components #2, 3, 4 and 5		
		Not required
Component #6	Chock Detail	
	If $d_9 > w_{f12}$ and:	
A_6	Always	$A_6 = d_{12} - t_{f12}$
B_6	Always	$B_6 = .5(d_9 - t_{w9}) - .25"$
E_6	If $t_{w12} > t_d$ and $t_d > .5"$	$E_6 = t_d$
	If $t_{w12} \leq t_d$ and $t_{w12} > .5"$	$E_6 = t_{w12}$
	If $t_{w12} \leq .5"$ or $t_d \leq .5"$	$E_6 = .5"$
F_6	If $k_{12} - t_{f12} > .5"$	$F_6 = k_{12} - t_{f12}$
	If $k_{12} - t_{f12} \leq .5"$	$F_6 = .5"$
T_6	Always	$T_6 = t_{w12}$
	If $d_9 \leq w_{f12}$	Select in-line bracket from Table 8. Backing member = ⑫. Thickness of supported flange = t_{w12}.
Component #7	Beam Flange Insert	
	If d_9 w_{f12} and:	
A_7	Always	$A_7 = d_9 + 2t_{w9} + .5"$
B_7	Always	$B_7 = 3d_9$
C_7	Always	$C_7 = w_{f12}$
D_7	Always	$D_7 = d_9$
T_7	Always	$T_7 = t_{f12}$
	If $d_9 \leq w_{f12}$	Not required
Component #8		
		Not required
Component #9	Stanchion	
		No detail required
Components #10 and 11		
		Not required
Component #12		
M_{12}	If $d_9 > w_{f12}$	$M_{12} = 3d_9$
O_{12}		$O_{12} = d_{12} - T_7$
	If $d_9 \leq w_{f12}$	No detail required
Components #13 and 14		
		Not required

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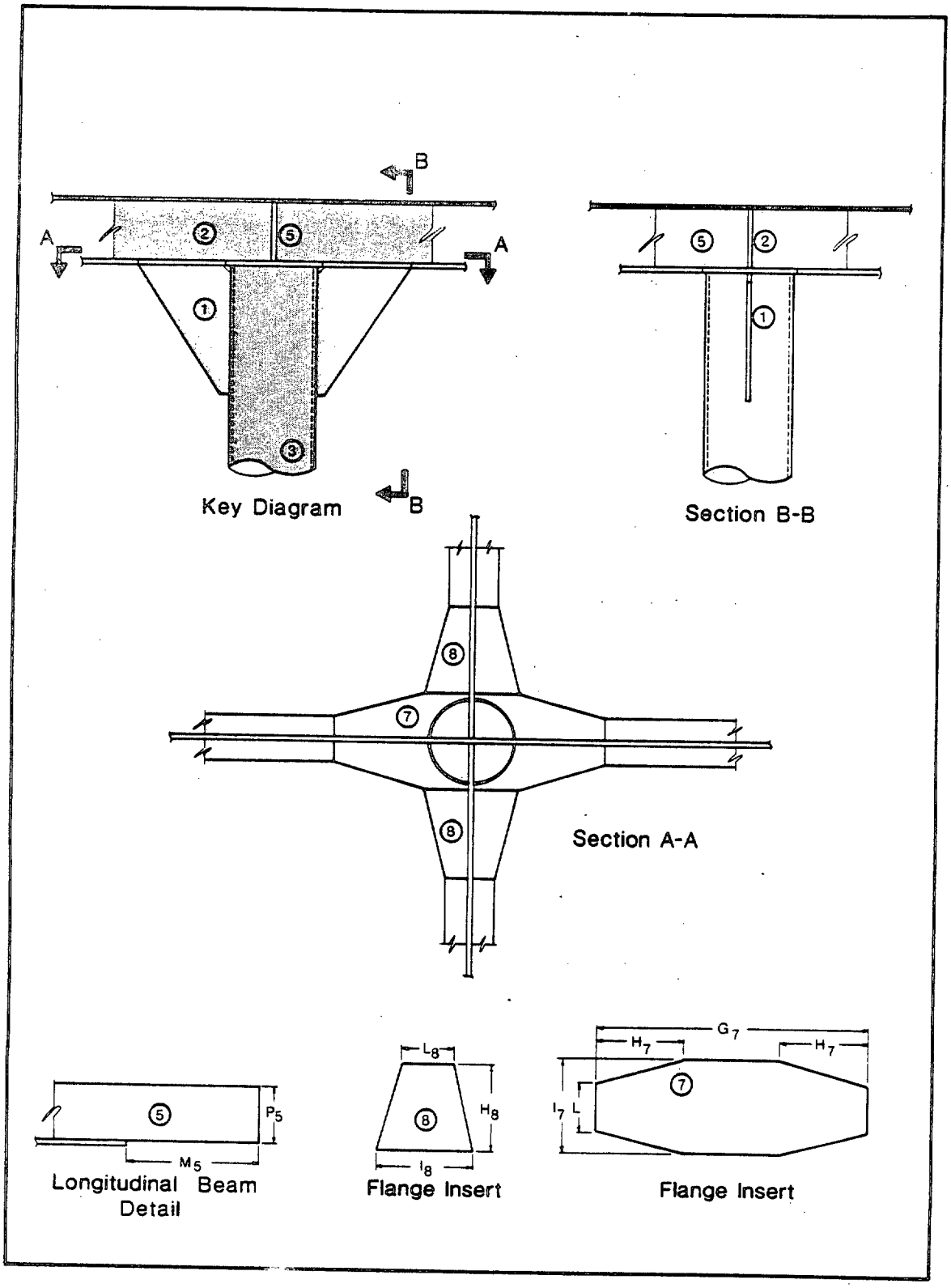
FIGURE 49. Light-tube stanchion: Supporting single beam. - Continued



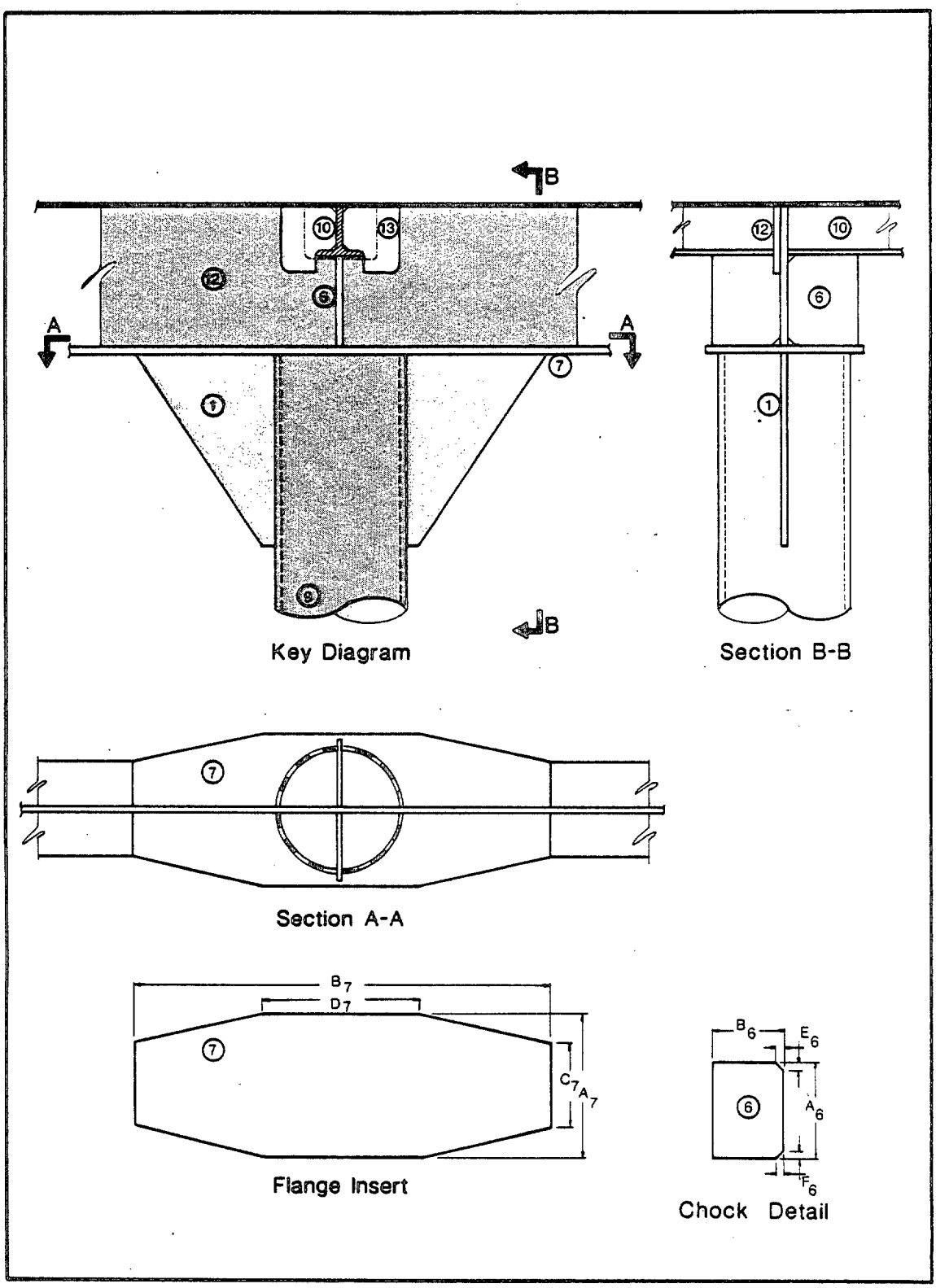
SH 13001

FIGURE 50. Light-tube stanchion: Supporting intersecting beams at equal heights.

Component #1	Stanchion Bracket	
	Always	Select light tube stanchion bracket from Table 24. Nominal size of tube stanchion = ⑨.
Components #2, 3, 4, 5 and 6		
		Not required
Component #7	Continuous Beam Flange Insert	
	If $d_9 > w_{f12}$ and:	
A_7	Always	$A_7 = d_9 + 2t_{w9} + .5"$
B_7	Always	$B_7 = 3d_9$
C_7	Always	$C_7 = w_{f12}$
D_7	Always	$D_7 = d_9$
T_7	Always	$T_7 = t_{f12}$
	If $d_9 \leq w_{f12}$	Not required
Component #8	Intercostal Beam Flange Insert	
	If $d_9 > w_{f12}$ and:	
A_8	Always	$A_8 = d_9$
B_8	Always	$B_8 = d_9$
C_8	Always	$C_8 = w_{f10}$
T_8	Always	$T_8 = t_{f10}$
	If $d_9 \leq w_{f12}$	Not required
Component #9	Tube Stanchion	
		No detail required
Component #10	Intercostal Beam	
	If $d_9 > w_{f12}$ and:	
M_{10}	Always	$M_{10} = .5(A_7 - t_{w12})$
O_{10}	Always	$O_{10} = d_{12} - T_7$
	If $d_9 \leq w_{f12}$ and:	
M_{10}	Always	$M_{10} = .5(w_{f12} - t_{w12})$
O_{10}	Always	$O_{10} = d_{12} - t_{f12}$
Component #11	Intercostal Beam	
M_{11}	Always	$M_{11} = M_{10}$
O_{11}	Always	$O_{11} = O_{10}$
Component #12	Continuous Beam	
	If $d_9 > w_{f12}$ and:	
M_{12}	Always	$M_{12} = 3d_9$
O_{12}	Always	$O_{12} = d_{12} - T_7$
	If $d_9 \leq w_{f12}$	No detail required

SH 13001

FIGURE 50. Light-tube stanchion: Supporting intersecting beams at equal heights. - Continued



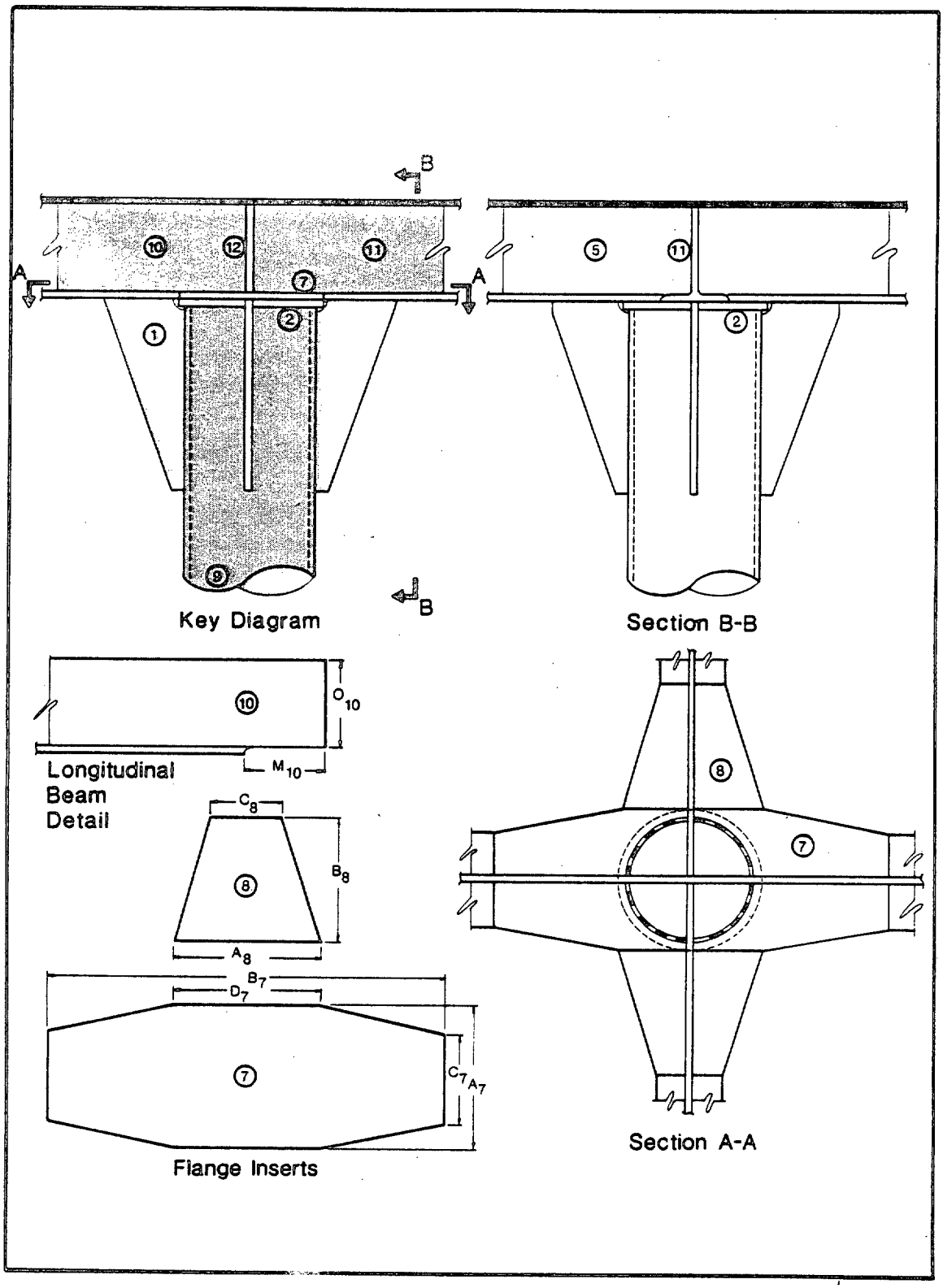
SH 13002

FIGURE 51. Light-tube stanchion: Supporting intersecting beams at unequal heights.

Component #1	Stanchion Bracket	
	Always	Select light tube stanchion bracket from Table 24. Nominal size of tube stanchion = (9).
Components #2, 3, 4 and 5		
		Not required
Component #6	Chock Detail	
A_6	Always	$A_6=d_{12}-t_{f12}-d_{10}$
B_6	If $d_9>w_{f12}$	$B_6=.5(d_9-t_{w12})-.25"$
	If $d_9\leq w_{f12}$	$B_6=.5(w_{f12}-t_{w12})-.25"$
E_6	If $t_{w12}>t_{f10}$ and $t_{f10}>.5"$	$E_6=t_{f10}$
	If $t_{w12}\leq t_{f10}$ and $t_{w12}>.5"$	$E_6=t_{w12}$
	If $t_{w12}\leq .5"$ or $t_{f10}\leq .5"$	$E_6=.5"$
F_6	If $d_9>w_{f12}$ and:	
	If $T_7>t_{w12}$ and $t_{w12}>.5"$	$F_6=t_{w12}$
	If $T_7\leq t_{w12}$ and $T_7>.5"$	$F_6=T_7$
	If $T_7\leq .5"$ or $t_{w12}\leq .5"$	$F_6=.5"$
	If $d_9\leq w_{f12}$ and:	
	If $k_{12}-t_{f12}>.5"$	$F_6=k_{12}-t_{f12}$
	If $k_{12}-t_{f12}\leq .5"$	$F_6=.5"$
T_6	Always	$T_6=t_{w12}$
Component #7	Continuous Beam Flange Insert	
A_7	If $d_9>w_{f12}$ and:	$A_7=d_9+2t_{w9}+.5"$
A_7	Always	$A_7=d_9+2t_{w9}+.5"$
B_7	Always	$B_7=3d_9$
C_7	Always	$C_7=w_{f12}$
D_7	Always	$D_7=d_9$
T_7	Always	$T_7=t_{f12}$
	If $d_9\leq w_{f12}$	Not required
Components #8 and 9	Intercostal Beam Flange Insert	
		Not required
Components #10 and 11		
	Note: Cutback of flange not permitted	No detail required
Component #12	Continuous Beam	
	If shallower member is continuous	$Q_{12}=d_3+.125"$ $R_{12}=w_{f10}+1.5"$
	If shallower member is intercostal	No detail required
Component #13	Collar	
	If shallower member is continuous	Select lapped or flush collar from Table 13 or 14. Piercing member = (10).
	If shallower member is intercostal	Not required

SH 13002

FIGURE 51. Light-tube stanchion: Supporting intersecting beams at unequal heights. - Continued



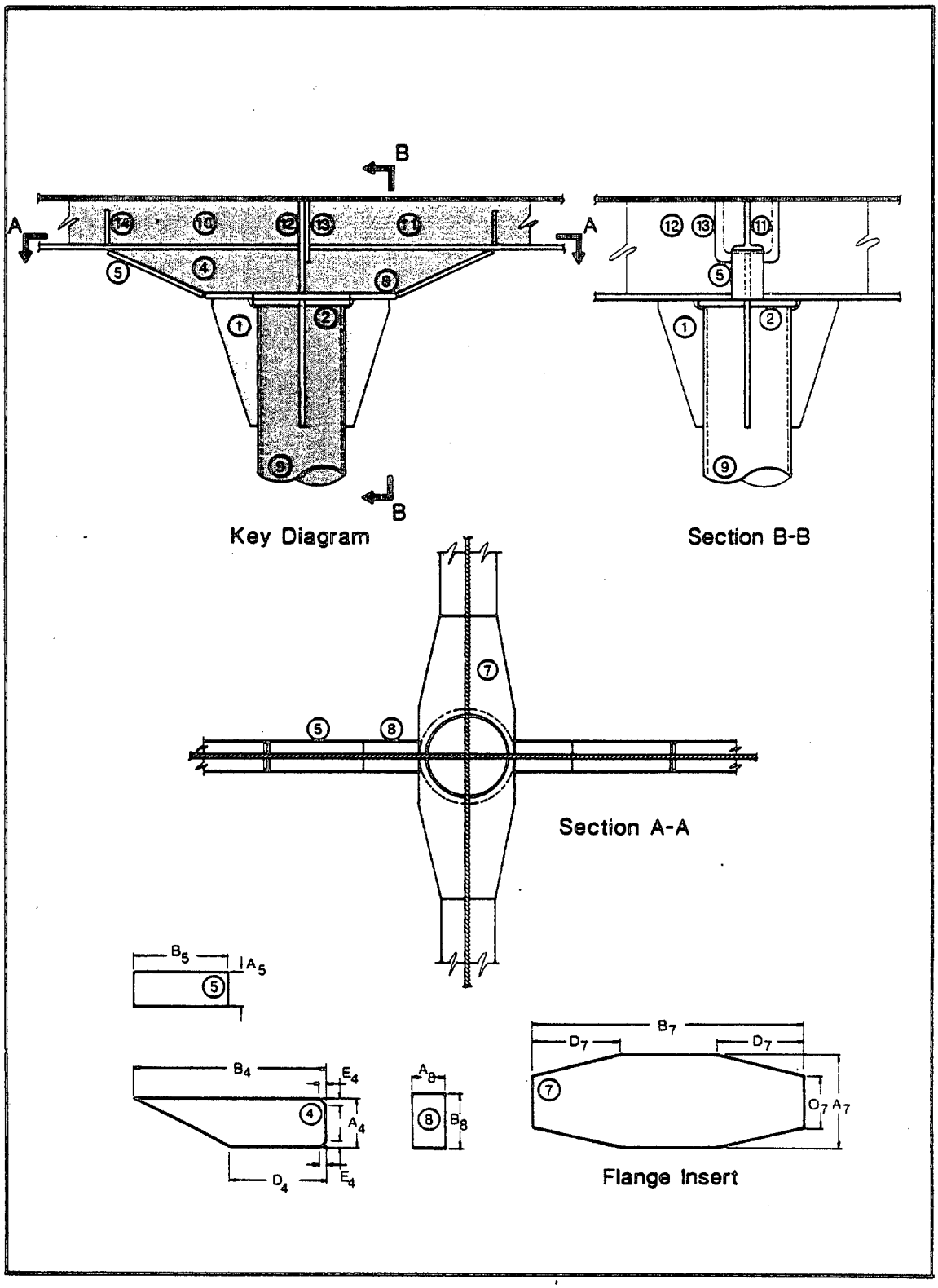
SH 13003

FIGURE 52. Heavy-tube stanchion: Supporting intersecting beams at equal heights.

Component #1	Stanchion Bracket	
	Always	Select heavy tube stanchion bracket from Table 25. Nominal size of tube stanchion = ⑨.
Component #2	Sole/Cap Plate	
	Always	Select sole/cap plate from Table 26. Nominal size of tube stanchion = ⑨.
Components #3, 4, 5 and 6		
		Not required
Component #7	Continuous Beam Flange Insert	
	If $d_9 > w_{f12}$ and:	
A_7	Always	$A_7 = d_9 + 2t_{w9} + .5"$
B_7	Always	$B_7 = 3d_9$
C_7	Always	$C_7 = w_{f12}$
D_7	Always	$D_7 = d_9$
T_7	Always	$T_7 = t_{f12}$
	If $d_9 \leq w_{f12}$	Not required
Component #8	Intercostal Beam Flange Insert	
	If $d_9 > w_{f12}$ and:	
A_8	Always	$A_8 = d_9$
B_8	Always	$B_8 = d_9$
C_8	Always	$C_8 = w_{f10}$
T_8	Always	$T_8 = t_{f10}$
	If $d_9 \leq w_{f12}$	Not required
Component #9	Tube Stanchion	
		No detail required
Component #10	Intercostal Beam	
	If $d_9 > w_{f12}$ and:	
M_{10}	Always	$M_{10} = .5(A_7 - t_{w12})$
O_{10}	Always	$O_{10} = d_{12} - t_{f12}$
	If $d_9 \leq w_{f12}$ and:	
M_{10}	Always	$M_{10} = .5(w_{f12} - t_{w12})$
O_{10}	Always	$O_{10} = d_{12} - t_{f12}$
Component #11	Intercostal Beam	
M_{11}	Always	$M_{11} = M_{10}$
O_{11}	Always	$O_{11} = O_{10}$
Component #12	Continuous Beam	
	If $d_9 > w_{f12}$ and:	
M_{12}	Always	$M_{12} = 3d_9$
O_{12}	Always	$O_{12} = d_{12} - T_7$
	If $d_9 \leq w_{f12}$	No detail required

SH 13003

FIGURE 52. Heavy-tube stanchion: Supporting intersecting beams at equal heights. - Continued



SH 13004

FIGURE 53. Heavy-tube stanchion: Supporting intersecting beams at unequal heights.

Component #1	Stanchion Bracket	
	Always	Select heavy tube stanchion bracket from Table 25. Nominal size of tube stanchion = ⑨.
Component #2	Sole/Cap Plate	
	Always	Select sole/cap plate from Table 26. Nominal size of tube stanchion = ⑨.
Component #3	Chock	
		Not required
Component #4	Beam Bracket Web	
A_4	If $d_9 > w_{f12}$	$A_4 = d_{12} - T_7 - d_{10}$
	If $d_9 \leq w_{f12}$	$A_4 = d_{12} - t_{f12} - d_{10}$
B_4	If $2d_{10} > .125\ \ell_{10}$	$B_4 = 2d_{10}$
	If $2d_{10} \leq .125\ \ell_{10}$	$B_4 = .125\ \ell_{10}$
	If $d_9 > w_{f12}$ and $B_4 < .5(A_7 - t_{w12}) + B_8 + A_4$	$B_4 = .5(A_7 - T_{w12}) + B_8 + A_4$
	If $d_9 \leq w_{f12}$ and $B_4 < .5(w_{f12} - t_{w12}) + B_8 + A_4$	$B_4 = .5(w_{f12} - t_{w12}) + B_8 + A_4$
D_4	If $d_9 > w_{f12}$	$D_4 = .5(A_7 - t_{w12}) + B_8$
	If $d_9 \leq w_{f12}$	$D_4 = .5(w_{f12} - t_{w12}) + B_8$
E_4	If $t_{w12} > t_{f10}$ and $t_{f10} > .5"$	$E_4 = t_{f10}$
	If $t_{w12} \leq t_{f10}$ and $t_{w12} > .5"$	$E_4 = t_{w12}$
	If $t_{w12} \leq .5"$ or $t_{f10} \leq .5"$	$E_4 = .5"$
F_4	If $d_9 > w_{f12}$ and:	
	$t_{w12} > T_7$ and $T_7 > .5"$	$F_4 = T_7$
	$t_{w12} \leq T_7$ and $t_{w12} > .5"$	$F_4 = t_{w12}$
	$t_{w12} \leq .5"$ or $T_7 \leq .5"$	$F_4 = .5"$
	If $d_9 \leq w_{f12}$ and:	
	$k_{12} - t_{f12} > .5"$	$F_4 = k_{12} - t_{f12}$
	$k_{12} - t_{f12} \leq .5"$	$F_4 = .5"$
T_4	Always	$T_4 = t_{w10}$
Component #5	Beam Bracket Flange	
A_5	Always	$A_5 = w_{f10}$
B_5	Always	$B_5 = (A_4^2 + (B_4 - D_4)^2)^{1/2}$
T_5	Always	$T_5 = t_{f10}$
Component #7	Continuous Beam Flange Insert	
	If $d_9 > w_{f12}$ and:	
A_7	Always	$A_7 = d_9 + 2t_{w9} + .5$
B_7	Always	$B_7 = 3d_9$
C_7	Always	$C_7 = w_{f10}$
D_7	Always	$D_7 = d_9$
T_7	Always	$T_7 = t_{f12}$
	If $d_9 \leq w_{f12}$	Not required

SH 13004

FIGURE 53. Heavy-tube stanchion: Supporting intersecting beams at unequal heights. - Continued

Component #8	Intercostal Beam Flange Insert	
	If $d_9 > w_{\beta 12}$ and:	
A_8	Always	$A_8 = w_{\beta 10}$
B_8	Always	$B_8 = d_9 + 1.5" - .5\ A_7$
	If $d_9 \leq w_{\beta 12}$ and:	
A_8	Always	$A_8 = w_{\beta 10}$
B_8	Always	$B_8 = d_9 - .5\ w_{\beta 12} + 1.5$
Component #9	Tube Stanchion	
		No detail required
Component #10		
G_{10}	Always	$G_{10} = B_4 - 1.5"$
H_{10}	If $1.5\ w_{\beta 10} \leq G_{10}$	$H_{10} = 1.5\ w_{\beta 10}$
	If $1.5\ w_{\beta 10} > G_{10}$	$H_{10} = G_{10}$
L_{10}	Always	$L_{10} = 3t_{w10} + 2.5"$
Component #11		
	If shallower beam is intercostal and:	
G_{11}	Always	$G_{11} = B_4 - 1.5"$
H_{11}	$1.5\ w_{\beta 10} \leq G_{11}$	$H_{11} = 1.5\ w_{\beta 10}$
	$1.5\ w_{\beta 10} > G_{11}$	$H_{11} = G_{11}$
	If shallower beam is continuous and:	
G_{11}	Always	$G_{11} = B_4 + t_{w12} - 1.5"$
H_{11}	$1.5\ w_{\beta 11} \leq G_{11} - t_{w12}$	$H_{11} = 1.5\ w_{\beta 11}$
	$1.5\ w_{\beta 11} > G_{11} - t_{w12}$	$H_{11} = G_{11} - t_{w12}$
L_{11}	Always	$L_{11} = 3t_{w11} + .25"$
Component #12		
	If $d_9 > w_{\beta 12}$	
M_{12}	Always	$M_{12} = 3d_9$
O_{12}	Always	$O_{12} = d_{12} - T_7$
Q_{12}; R_{12}	If shallower member is intercostal	No cut-out required
	If shallower member is continuous and:	
	Always	$Q_{12} = d_{10} + .125"$
	Flange cut away	$R_{12} = 3t_{w10} + 1.5"$
	Flange intact	$R_{12} = w_{\beta 10} + 1.5"$
Component #13	Collar	
	If shallower member is continuous	Select lapped or flush collar from Table 13 or 14. Piercing member = (10).
	If shallower member is intercostal	Not required
Component #14	Tangency Bracket	
	Always	Select tangency bracket from Table 5. Member to be bracketed = (10).

SH 13004

FIGURE 53. Heavy-tube stanchion: Supporting intersecting beams at unequal heights. - Continued

APPENDIX A

DEFINITION OF VARIABLE NAMING CONVENTIONS IN THIS HANDBOOK

10. SCOPE

10.1 Use of capitalization and lower case as variable names. Throughout this handbook, capitalized variables are used to indicate dimensions or characteristics which are calculated within a set of algorithms. Conversely, dimensions or characteristics which are calculated or assigned outside a set of algorithms are expressed as lower case variables. For example, dimensions of structural shapes (depth, web thickness, and so forth) are defined by AISC standards and are therefore expressed as lower case variables (d, w_t, and so forth).

10.2 Use of subscripts. Both numeric and lower case literal subscripts are used in this handbook to associate a particular characteristic dimension with a particular component or feature.

Literal subscripts are defined as follows:

- b - backing structure
- f - flange
- i - inside
- o - outside
- w - web

Examples:

- t_w - web thickness or wall thickness
- t_b - thickness of backing structure
- d_i - inside diameter
- d_o - outside diameter

Numeric subscripts are used to identify specific components of a complex intersection detail. For consistency within a generic group of intersection details, the following definitions have been assigned:

Group 1 - Longitudinal and bulkhead stiffener

Subscript	Definition
1w	Beam bracket web, stiffener side
1f	Beam bracket flange, stiffener side
2w	Beam bracket web, opposite side
2f	Beam bracket flange, opposite side
3	Longitudinal, stiffener side
4	Longitudinal, opposite side
5	Bulkhead stiffener
6	Tangency bracket, stiffener side
7	Toe bracket
8	Toe bracket
9	In-line bracket
10	Tangency bracket, opposite side
11	Collar
12	Bulkhead
13	Deck

Group 2 - Longitudinal and transverse intersections

Subscript	Definition
1w	Beam bracket web (identical both sides)
1f	Beam bracket flange (identical both sides)
2	Web insert
3	Longitudinal, molded side
4	Longitudinal, opposite side
5	Transverse
6	Tangency bracket (identical both sides)
7	Collar
8	Deck

Group 3 - Corner bracket

Subscript	Definition
1w	Beam bracket web
1f	Beam bracket flange
2	Shallower member
3	Deeper member
4	Tangency bracket
5	Toe bracket
6	Plating associated with deeper member (bulkhead, shell or deck)
7	Plating associated with shallower member

Group 4 - Stanchion details

Subscript	Definition
1	Stanchion bracket
2	Cap sole plate
3	Stanchion chock
4	Beam bracket web
5	Beam bracket flange
6	In-line bracket
7	Flange insert, continuous beam
8	Flange insert, intercostal beam
9	Stanchion
10	Intercostal (or shallower) beam, molded side
11	Intercostal (or shallower) beam, opposite side
12	Continuous (or deeper) beam
13	Collar
14	Tangency bracket
15	Deck

APPENDIX B

SELECTED MEASUREMENT UNITS AND CONVERSION FACTORS

10. SCOPE

10.1 Scope. This handbook establishes strength requirements in inch-pound units. Measurement units recommended for use as well as the pertinent conversion factors are compiled in table XXVII.

TABLE XXVII. Selected SI conversion factors.

Category	To convert from inch-pound units	To SI units	Multiply by
Length	foot (ft)	meter	0.3048
	inch (in)	meter	$2.540\ 10^{-2}$
	inch (in)	mm	25.4
Area	$foot^2$ (ft^2)	$meter^2$ (m^2)	$9.290\ 10^{-2}$
	$inch^2$ (in^2)	mm^2	$6.452\ 10^{-3}$
Force	kip	newton (N)	$4.448\ 10^{-3}$
	pound-force (lbf)	newton (N)	4.448
Mass	pound (lb)	kilogram (kg)	0.454
	ton (long, 2240 lb)	metric ton	1.016
Stress (force/area)	$kip/inch^2$ (ksi)	pascal (Pa)	$6.895\ 10^{6}$
	$pound\text{-}force/inch^2$ (lb/in^2)	pascal (Pa)	$6.895\ 10^{3}$

10.2 SI makes extensive use of prefixes to form decimal multiples, it officially establishes 16 prefixes. Those four prefixes most frequently used are as follows:

mega	M	$1,000,000 = 10^6$
kilo	k	$1,000 = 10^3$
centi	c	$0.01 = 10^{-2}$
milli	m	$0.001 = 10^{-3}$

APPENDIX C

ALLOWABLE DIMENSIONAL VARIATION AND ROUNDING PRACTICE

10. SCOPE

10.1 Scope. The algorithms presented throughout this handbook permit the calculation of characteristic dimensions of structural details. Theoretically, the precision of these dimensions is limited only by the precision of the dimension of the structural shapes and configurations. Practically, however, and to simplify production control and tracking requirements, a practice must be established which permits similarly sized unique pieces to be grouped together. The computer program which has been used to produce the tables within this handbook accomplishes this by requiring the specification of two attributes for each characteristic dimension:

(a) Allowable variation unit. This value sets the maximum variation between the calculated dimension and the dimension of the unique piece. It is specified in inches.
(b) Rounding practice. This attribute defines whether the calculated dimension should be rounded down, up or to the nearest allowable variation unit.

10.2 The actual values for the allowable variation and rounding practice which have been used for the tables presented in this book are presented in table XXVIII. General guidance for each of five classes of dimensions is provided as follows:

(a) Major unconstrained dimensions (dimensions greater than 10 inches):
Allowable variation = 0.1 inch
Rounding practice = Round up (that is, plus 1.0, minus 0)
(b) Minor unconstrained dimensions:
Allowable variation = 0.5 inch
Rounding practice = Round up (that is, plus 0.5, minus 0)
(c) Snipe dimensions:
Allowable variation = 0.25 inch
Rounding practice = Round up (that is, plus 0.25, minus 0)
(d) Constrained dimensions:
Allowable variation = 0.25 inch
Rounding practice = Round down (that is, plus 0, minus 0.25)
(e) Plate thickness:
Allowable variation = 0.125 inch
Rounding practice = Round up (that is, plus 0.125, minus 0)

10.3 Dimensions which must not overhang a flange of an associated structural shape are defined as constrained dimensions. Dimensions which are constrained by geometry of adjacent structures (for example, a full chock or in-line bracket which must fit between a flange and plating) are defined as "neat fit" dimensions. These dimensions are identified by an asterisk (*) in the algorithms for the elemental details. The tabulated values for these dimensions use the allowable variation and rounding practice for constrained dimensions as defined in the preceding paragraph on rounding practice. This means that the tabulated dimensions will fit into the theoretically available space with a root gap of no more than 0.25 inch. To satisfy the welding root gap requirements in accordance with MIL-STD-22 and prevent the possibility of oversized pieces, the fabrication tolerances for these tabulated dimensions as well as the dimensions of the rolled or cut shapes must be defined and controlled accordingly.

TABLE XXVIII. Table of variations and round-off practices.

DETAIL NO	DETAIL TITLE	DIMENSION	VARIATION	ROUND-OFF	SORT PRIORITY
1	Tangency Bracket				
		1	1.0000	UP	3
		2	0.2500	DOWN	2
		3	0.2500	UP	4
		4	0.1250	UP	1
2	Toe Bracket				
		1	1.0000	UP	3
		2	0.2500	DOWN	2
		3	0.5000	UP	4
		4	0.1250	UP	1
3	Full Chock				
		1	0.5000	UP	3
		2	0.2500	DOWN	2
		3	0.2500	DOWN	4
		4	0.2500	UP	5
		5	0.2500	UP	6
		6	0.1250	UP	1
4	Plate Bracket				
		1	1.0000	UP	3
		2	0.5000	UP	2
		3	0.1250	UP	1
5	Lug Collar				
		1	1.0000	UP	3
		2	0.5000	UP	2
		3	0.1250	UP	1
6	Flush Collar				
		1	0.2500	DOWN	4
		2	0.2500	DOWN	3
		3	0.2500	DOWN	2
		4	0.2500	UP	5
		5	0.2500	UP	6
		6	0.1250	UP	1
7	Lapped Collar				
		1	1.0000	UP	3
		2	0.2500	DOWN	4
		3	0.2500	DOWN	2
		4	0.2500	UP	5
		5	0.2500	UP	6
		6	0.1250	UP	1
8	In-Line Bracket				
		1	0.2500	DOWN	3
		2	0.2500	DOWN	2
		3	0.2500	UP	4
		4	0.1250	UP	1
9	LT Stanchion Bkt				
		1	1.0000	UP	3
		2	0.5000	UP	2
		3	0.2500	UP	4
		4	0.1250	UP	1
10	HT Stanchion Bkt				
		1	1.0000	UP	3
		2	0.5000	UP	2
		3	0.2500	UP	4
		4	0.1250	UP	1

TABLE XXVIII. Table of variations and round-off practices. - Continued

11	TS Sole Plate				
		1	1.0000	UP	2
		2	0.1250	UP	1
12	Hull Pad				
		1	1.0000	UP	2
		2	1.0000	UP	3
		3	0.2500	UP	1
13	ILS Insert				
		1	0.2500	DOWN	3
		2	0.2500	DOWN	2
		3	0.2500	UP	4
		4	0.1250	UP	1
14	ILS Plates				
		1	0.2500	DOWN	3
		2	0.2500	DOWN	4
		3	0.2500	UP	5
		4	0.2500	UP	2
		5	0.1250	UP	1
15	IBS Bracket				
		1	1.0000	UP	3
		2	0.5000	UP	2
		3	0.2500	DOWN	4
		4	0.2500	UP	5
		5	0.2500	UP	6
		6	0.1250	UP	1
16	IBS Sole Plate				
		1	1.0000	UP	3
		2	1.0000	UP	2
		3	0.1250	UP	1
17	IBS Chock				
		1	0.2500	DOWN	3
		2	0.2500	DOWN	2
		3	0.2500	UP	4
		4	0.1250	UP	1

APPENDIX D

USE AND INTERPRETATION OF TABLES

10. SCOPE

10.1 Scope. Three tabular formats are used throughout this handbook as follows:

(a) Dimensional tables
(b) Index tables
(c) Catalog tables

10.2 Dimensional tables present for each structural shape are as follows:

(a) The nominal size of the shape (depth x width x weight - type).
(b) The characteristic dimensions of the appropriate detail piece.
(c) An identifier which correlates all identical pieces.

10.3 To use a dimensional table, enter with the appropriate structural shape and read the corresponding dimensions and piece identifier. Dimensional tables are provided for as follows:

(a) Tangency bracket
(b) Full chock
(c) Plate bracket
(d) Lug collar
(e) Lapped collar
(f) Flush collar
(g) Light tube stanchion bracket
(h) Heavy tube stanchion bracket
(i) Tube stanchion sole cap plate

10.4 Index tables are used when the characteristic dimensions of a particular detail are related to two adjacent structural components or when a particular detail is used in various applications. The following paragraphs provide guidance in the use and interpretation of each index table.

(a) Toe bracket. Rows represent the nominal size of the member to be bracketed. Columns represent the thickness of the backing structure and range from 0.1875 to 1.0 inch. Table entries present the unique piece identifier which is applicable for that row-column combination. The identifiers reference the toe bracket catalog table.
(b) In-line bracket. Rows represent the nominal size of the backing member. Columns represent the thickness of the flange of the member to be bracketed and range from 0.1875 to 1.0 inch. Table entries present the unique piece identifier which is applicable for that row-column combination. The identifier references the in-line bracket catalog table.

(c) Hull pad. Rows represent the nominal size of the member which is terminating. Columns represent the thickness of the backing structure assuming that the hull pad is ordinary strength steel. Table entries present the unique piece identifier which is applicable for that row-column combination. The identifiers reference the hull pad catalog table.

(d) Intermediate lateral support (ILS). Rows represent the nominal size of the member to be supported. ILS may be provided in one of three ways: (1) ILS members cut from shallower members, (2) ILS members cut from plate, (3) In-line brackets used as ILS members when the backing structure is sufficiently heavy to support concentrated loads. Columns one through four relate to the first alternative, column five the second, and column six the third.

(1) ILS members cut from shallower members (columns 1 through 4) are governed by requirements which are placed on both the cross-sectional area and the depth of the ILS member as a function of the cross-sectional area and depth of the member being supported. Thus the best ILS member is either the lightest which satisfies the depth constraint, or the shallowest which satisfies the cross-sectional area constraint. This table provides both the shallowest (columns 1 and 2) and the lightest (columns 3 and 4) ILS members. Columns 1 and 3 present the structural shape to be used as ILS and refer to the structural shape catalog table I. Columns 2 and 4 present the insert which alines with the web of the ILS and refers to the ILS insert catalog table.

(2) Plate ILS members (column 5) are cut from a plate of sufficient thickness to satisfy cross-sectional area requirements. They provide a neat fit to the flange of the member being supported and therefore do not require additional inserts. Table entries refer to the standard ILS plates catalog table.

(3) In-line bracket ILS members (column 6) are used in situations where the backing structure is sufficiently heavy that typical ILS may be replaced with an in-line bracket, thus saving weight and welding time. Although in-line brackets are designed to serve a different purpose, the configuration is identical. Entries refer to the in-line bracket catalog table.

(e) I-beam stanchion. Rows represent the nominal size of the I-beam stanchion member. This detail is composed of three components: the bracket, the cap sole plate and the chock. Each of these three components is presented in its own catalog table and is related to the appropriate stanchion member in the table. Catalog tables present the characteristic dimensions of each specific detail component referenced in the corresponding index tables. The identification number relates to the entries of the corresponding index table. The unique pieces have been sorted and ordered according to thickness, width and length. The final column of each catalog table (number of applications) presents the number of applications in which each unique piece number has been referenced in the corresponding index table. Number of applications for the in-line bracket refers only to the in-line bracket index table (that is, not to the ILS index table).

Preparing Activity:
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1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-HDBK-283(SH)	STRUCTURAL SHIPBUILDING DETAILS USING TEE STIFFENERS

3a. NAME OF SUBMITTING ORGANIZATION

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5. PROBLEM AREAS

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c. Reason/Rationale for Recommendation:

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NOTICE 1
26 March 1991

MILITARY HANDBOOK

STRUCTURAL SHIPBUILDING DETAILS USING TEE STIFFENERS

MIL-HDBK-283, dated 15 July 1985, has been reviewed and determined to be valid for use in acquisition.

Preparing activity:
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AMSC N/A FSC 9520

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