

Table 2-2
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
1100-H14 Sheet, Plate, Drawn Tube

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress				
	Any tension member	gross section net section		8.5 8	5.5 2.1			
TENSION IN BEAMS, extreme fiber, net section	Flat elements in uniform tension		1	8.5 8	5.5			
	Round or oval tubes		2	8	2.1			
	Flat elements in bending in their own plane, symmetric shapes		3	10	2.5			
	On rivets and bolts		4	11	2.8			
	On flat surfaces and pins and on bolts in slotted holes		5	16	11.5			
	BEARING		6	11	7.5			
COMPRESSION IN COLUMNS, axial	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
	All columns		7	—	0	$74 - 0.034 kL/r$	144	$51100 / (kL/r)^2$
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	—	0	$1.9 - 0.0045 kL/r$	280	$51100 / (kL/r)^2$
	Flat elements supported on one edge – columns not buckling about a symmetry axis			8.1	8	3.8	$8.7 - 0.224 b/t$	19
	Flat elements supported on both edges		9	2.1	1.2	$2.2 - 0.027 b/t$	39	$42 / (b/t)$
	Flat elements supported on one edge and with stiffener on other edge			9.1	8	12	$8.7 - 0.224 b/t$	26
	Flat elements supported on both edges and with an intermediate stiffener		9.2	8	6.6	$2.2 - 0.027 b/t$	52	$1970 / (b/t)^2$
	Curved elements supported on both edges			10	2.1	2.6	$8.7 - 0.070 b/t$	62
	COMPRESSION IN COLUMN ELEMENTS, gross section					$2.2 - 0.0086 b/t$	125	$135 / (b/t)$
						see Part IA Section 3.4.9.1		
					see Part IA Section 3.4.9.2			
			8	6.6	$8.6 - 0.275 \sqrt{R_b/t}$	450	$3190 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$	
			2.1	2.6	$2.2 - 0.044 \sqrt{R_b/t}$	1380	$3190 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$	

White bars apply to unwelded metal

Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

**Table 2-5
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
Alclad 3004-H34 Sheet**

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress				
	Any tension member	gross section net section		14.5 16	11			
TENSION	Any tension member		1	14.5 16	11			
TENSION IN BEAMS, extreme fiber, net section	Flat elements in uniform tension		2	14.5	4.8			
	Round or oval tubes		3	17	5.5			
BEARING	Flat elements in bending in their own plane, symmetric shapes		4	19	6.5			
	On rivets and bolts		5	32	22			
	On flat surfaces and pins and on bolts in slotted holes		6	21	14.5			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
COMPRESSION IN COLUMNS, axial	All columns							
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on one edge - columns buckling about a symmetry axis		8	12.5	4.0	14.7 - 0.488 b/t	15	110 / (b/t)
	Flat elements supported on one edge - columns not buckling about a symmetry axis		8.1	4.8	3.3	5.2 - 0.102 b/t	25	66 / (b/t)
	Flat elements supported on both edges		9	12.5	4.0	14.7 - 0.488 b/t	20	1970 / (b/t) ²
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on one edge and with stiffener on other edge		9.1	4.8	3.3	5.2 - 0.102 b/t	34	1970 / (b/t) ²
	Flat elements supported on both edges and with an intermediate stiffener		9.2	12.5	7.4	14.2 - 0.536 $\sqrt{R_b/t}$	280	3190 / $\left(\frac{R_b}{t}\right) \left(1 + \frac{\sqrt{R_b/t^2}}{35}\right)$
	Curved elements supported on both edges		10	4.8	5.4	5.2 - 0.140 $\sqrt{R_b/t}$	800	3190 / $\left(\frac{R_b}{t}\right) \left(1 + \frac{\sqrt{R_b/t^2}}{35}\right)$

White bars apply to unwelded metal
 Shaded bars apply to weld-affected metal
 For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

see Part IA Section 3.4.9.1
 see Part IA Section 3.4.9.2

Table 2-6
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5005-H14 Sheet and Plate

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress				
	Any tension member	gross section net section		S_1	S_2			
TENSION, axial	Any tension member	gross section net section	1	10.5 11	7.5			
TENSION IN BEAMS, extreme fiber, net section	Flat elements in uniform tension		2	10.5	3.0			
	Round or oval tubes		3	12	3.5			
	Flat elements in bending in their own plane, symmetric shapes		4	13.5	3.9			
BEARING	On rivets and bolts		5	22	15			
	On flat surfaces and pins and on bolts in slotted holes		6	14.5	10.5			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
COMPRESSION IN COLUMNS, axial	All columns		7	-	0	$8.6 - 0.043 \text{ } kL/r$	133	$51100 \text{ } / (kL/r)^2$
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	9	3.9	$10.2 - 0.282 \text{ } b/t$	18	$92 \text{ } / (b/t)$
	Flat elements supported on one edge – columns not buckling about a symmetry axis		8.1	3.0	2.3	$3.1 - 0.048 \text{ } b/t$	33	$51 \text{ } / (b/t)$
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	9	3.9	$10.2 - 0.282 \text{ } b/t$	24	$1970 \text{ } / (b/t)^2$
	Flat elements supported on one edge and with stiffener on other edge		9.1	3.0	2.3	$3.1 - 0.048 \text{ } b/t$	43	$1970 \text{ } / (b/t)^2$
	Flat elements supported on both edges and with an intermediate stiffener		9.2	9	6.9	$10.0 - 0.335 \sqrt{R_b/t}$	390	$3190 \text{ } / \left(\frac{R_b}{t} \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right) \right)$
Curved elements supported on both edges		10	3.0	3.9	$3.2 - 0.073 \sqrt{R_b/t}$	1070	$3190 \text{ } / \left(\frac{R_b}{t} \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right) \right)$	

White bars apply to unwelded metal

Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

see Part IA Section 3.4.9.1

see Part IA Section 3.4.9.2

Table 2-7
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5005-H34 Sheet and Plate

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress				
	Any tension member	gross section net section		S ₁	S ₂			
TENSION, axial	Any tension member	gross section net section	1	9 10.5	7.5			
TENSION IN BEAMS, extreme fiber, net section	Flat elements in uniform tension		2	9	3.0			
	Round or oval tubes		3	10.5	3.5			
	Flat elements in bending in their own plane, symmetric shapes		4	12	3.9			
BEARING	On rivets and bolts		5	21	15			
	On flat surfaces and pins and on bolts in slotted holes		6	13.5	10.5			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, S ≤ S ₁	S ₁	Allowable Stress, S ₁ < S < S ₂	S ₂	Allowable Stress, S ≥ S ₂
COMPRESSION IN COLUMNS, axial	All columns		7	–	0	8.0 – 0.039 kL/r	138	51100 / (kL/r) ²
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	8.5	3.8	9.5 – 0.252 b/t	19	89 / (b/t)
	Flat elements supported on one edge – columns not buckling about a symmetry axis		8.1	3.0	2.3	3.1 – 0.048 b/t	33	51 / (b/t)
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	8.5	12	9.5 – 0.079 b/t	60	282 / (b/t)
	Flat elements supported on one edge and with stiffener on other edge		9.1	3.0	7	3.1 – 0.015 b/t	104	163 / (b/t)
	Flat elements supported on both edges and with an intermediate stiffener		9.2	see Part IA Section 3.4.9.2				
	Curved elements supported on both edges		10	8.5	6.8	9.3 – 0.305 √R _b /t	420	3190 / ((R _b /t) (1 + √(R _b /t) ² / 35))
				3.0	3.9	3.2 – 0.073 √R _b /t	1070	3190 / ((R _b /t) (1 + √(R _b /t) ² / 35))

White bars apply to unwelded metal

Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for R_b/t < 20

**Table 2-8
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5050-H34 Sheet, Drawn Tube**


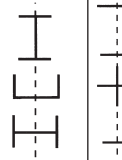


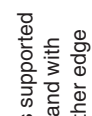


Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		
	Any tension member	gross section net section		12	13	9
TENSION IN BEAMS, extreme fiber, net section	Flat elements in uniform tension		2	12	13	9
	Round or oval tubes		3	12	14	3.6
	Flat elements in bending in their own plane, symmetric shapes		4	16	16	4.3
BEARING	On rivets and bolts		5	26	18	4.7
	On flat surfaces and pins and on bolts in slotted holes		6	17	17	12.5
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S \geq S_2$
COMPRESSION IN COLUMNS, axial	All columns		7	-	0	$10.5 - 0.058 \text{ } kL/r$
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	-	0	$3.3 - 0.010 \text{ } kL/r$
	Flat elements supported on one edge – columns not buckling about a symmetry axis			11	4.0	$12.4 - 0.380 \text{ } b/t$
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	3.6	2.7	$3.8 - 0.065 \text{ } b/t$
	Flat elements supported on one edge and with stiffener on other edge			11	4.0	$12.4 - 0.380 \text{ } b/t$
	Flat elements supported on both edges and with an intermediate stiffener		9.1	3.6	2.7	$3.8 - 0.065 \text{ } b/t$
Curved elements supported on both edges		9.2	11	7.2	$12.1 - 0.432 \sqrt{R_b/t}$	$3190 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
Curved elements supported on both edges		10	3.6	4.5	$3.8 - 0.094 \sqrt{R_b/t}$	$3190 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$

White bars apply to unwelded metal
 Shaded bars apply to weld-affected metal
 For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b / t < 20$

see Part IA Section 3.4.9.1

see Part IA Section 3.4.9.2

**Table 2-9
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5052-H32 Sheet, Drawn Tube**

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress				
	Any tension member	gross section net section		S_1	S_2			
TENSION, axial	Any tension member	gross section	1	14	13			
	Flat elements in uniform tension	net section	2	14	6			
TENSION IN BEAMS, extreme fiber, net section	Round or oval tubes		3	16	6.5			
	Flat elements in bending in their own plane, symmetric shapes		4	18	7.5			
BEARING	On rivets and bolts		5	32	26			
	On flat surfaces and pins and on bolts in slotted holes		6	21	17			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
COMPRESSION IN COLUMNS, axial	All columns		7	-	0	$12.3 - 0.073 \text{ kL/r}$	112	$51600 / (kL/r)^2$
				-	0	$5.3 - 0.021 \text{ kL/r}$	170	$51600 / (kL/r)^2$
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	12.5	4.0	$14.7 - 0.486 \text{ b/t}$	15	111 / (b/t)
				6	3.5	$6.2 - 0.134 \text{ b/t}$	23	72 / (b/t)
	Flat elements supported on one edge – columns not buckling about a symmetry axis		8.1	12.5	4.0	$14.7 - 0.486 \text{ b/t}$	20	$1980 / (b/t)^2$
				6	3.5	$6.2 - 0.134 \text{ b/t}$	31	$1980 / (b/t)^2$
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	12.5	13	$14.7 - 0.152 \text{ b/t}$	48	353 / (b/t)
				6	11	$6.2 - 0.042 \text{ b/t}$	74	230 / (b/t)
			see Part IA Section 3.4.9.1					
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on one edge and with stiffener on other edge		9.1	see Part IA Section 3.4.9.2				
			9.2	see Part IA Section 3.4.9.2				
			see Part IA Section 3.4.9.2					
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges and with an intermediate stiffener		10	12.5	7.4	$14.2 - 0.535 \sqrt{R_b/t}$	280	$3230 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
				6	6.0	$6.2 - 0.177 \sqrt{R_b/t}$	730	$3230 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
COMPRESSION IN COLUMN ELEMENTS, gross section	Curved elements supported on both edges		10	12.5	7.4	$14.2 - 0.535 \sqrt{R_b/t}$	280	$3230 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
				6	6.0	$6.2 - 0.177 \sqrt{R_b/t}$	730	$3230 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$

White bars apply to unwelded metal
 Shaded bars apply to weld-affected metal
 For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b / t < 20$

Table 2-10
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5052-H34 Sheet, Plate, Drawn Tube





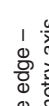
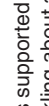
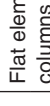

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress					
	Any tension member	gross section net section		S_1	S_2				
TENSION, axial	Any tension member	gross section	1	16	13				
	Flat elements in uniform tension	net section	2	16	6				
TENSION IN BEAMS, extreme fiber, net section	Round or oval tubes		3	18	6.5				
	Flat elements in bending in their own plane, symmetric shapes		4	20	7.5				
	On rivets and bolts		5	35	26				
BEARING	On flat surfaces and pins and on bolts in slotted holes		6	23	17				
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$	
COMPRESSION IN COLUMNS, axial	All columns		7	–	0	$14.2 - 0.091 kL/r$	104	$51600 / (kL/r)^2$	
			8	–	0	$5.3 - 0.021 kL/r$	170	$51600 / (kL/r)^2$	
			8.1	Flat elements supported on one edge – columns buckling about a symmetry axis	14.5	4.0	$17.0 - 0.604 b/t$	14	119 / (b/t)
				Flat elements supported on one edge – columns not buckling about a symmetry axis	6	3.5	$6.2 - 0.134 b/t$	23	72 / (b/t)
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	14.5	4.0	$17.0 - 0.604 b/t$	19	$1980 / (b/t)^2$	
			9.1	6	3.5	$6.2 - 0.134 b/t$	31	$1980 / (b/t)^2$	
			9.2	14.5	13	$17.0 - 0.190 b/t$	45	380 / (b/t)	
			9.1	6	11	$6.2 - 0.042 b/t$	74	230 / (b/t)	
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on one edge and with stiffener on other edge		9.1	see Part IA Section 3.4.9.1					
			9.2	see Part IA Section 3.4.9.2					
			10	14.5	7.5	$16.3 - 0.644 \sqrt{R_b/t}$	250	$3230 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$	
	Curved elements supported on both edges		10	6	6.0	$6.2 - 0.177 \sqrt{R_b/t}$	730	$3230 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$	

White bars apply to unwelded metal

Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b / t < 20$

Table 2-11
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5083-H111 Extrusions

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
				$S \leq S_1$	S_1			
TENSION, axial	Any tension member	gross section net section	1	14.5 21	20			
	Flat elements in uniform tension		2	14.5	9.5			
TENSION IN BEAMS, extreme fiber, net section	Round or oval tubes		3	17	11.5			
	Flat elements in bending in their own plane, symmetric shapes		4	19	12.5			
BEARING	On rivets and bolts		5	41	40			
	On flat surfaces and pins and on bolts in slotted holes		6	27	27			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
	COMPRESSION IN COLUMNS, axial	All columns	7	–	0	$12.3 - 0.073 \text{ kL/r}$	113	$52600 / (kL/r)^2$
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	12.5	4.1	$14.7 - 0.481 \text{ bit}$	15	$112 / (bit)$
				9	3.9	$10.2 - 0.278 \text{ bit}$	18	$93 / (bit)$
	Flat elements supported on one edge – columns not buckling about a symmetry axis		8.1	12.5	4.1	$14.7 - 0.481 \text{ bit}$	20	$2020 / (bit)^2$
				9	3.9	$10.2 - 0.278 \text{ bit}$	24	$2020 / (bit)^2$
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	12.5	13	$14.7 - 0.151 \text{ bit}$	49	$357 / (bit)$
				9	13	$10.2 - 0.087 \text{ bit}$	58	$297 / (bit)$
	Flat elements supported on one edge and with stiffener on other edge		9.1	see Part IA Section 3.4.9.1				
				see Part IA Section 3.4.9.2				
	Flat elements supported on both edges and with an intermediate stiffener		9.2	12.5	7.5	$14.2 - 0.531 \sqrt{R_b/t}$	290	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
				9	7.0	$10.0 - 0.332 \sqrt{R_b/t}$	570	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
	Curved elements supported on both edges		10	9	7.0	$10.0 - 0.332 \sqrt{R_b/t}$	570	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$

White bars apply to unwelded metal

Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

Table 2-12
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5083-H116, -H32, -H321 Sheet and Plate
(Thickness 0.188 to 1.500 in.)

White bars apply to unwelded metal
 Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
	Any tension member	gross section net section		19 23	21			
TENSION, axial	Flat elements in uniform tension		2	19	11			
	Round or oval tubes		3	22	13			
	Flat elements in bending in their own plane, symmetric shapes		4	24	14			
BEARING	On rivets and bolts		5	45	41			
	On flat surfaces and pins and on bolts in slotted holes		6	30	27			
COMPRESSION IN COLUMNS, axial	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
	All columns		7	-	0	$15.5 - 0.102 \ kL/r$	101	$52600 \ / (kL/r)^2$
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	-	0	$10.5 - 0.057 \ kL/r$	123	$52600 \ / (kL/r)^2$
	Flat elements supported on one edge – columns not buckling about a symmetry axis			8.1	16	4.1	$18.5 - 0.682 \ b/t$	14
	Flat elements supported on both edges		9	11	4.0	$12.4 - 0.374 \ b/t$	17	$103 \ / (b/t)$
	Flat elements supported on one edge and with stiffener on other edge			9.1	16	4.1	$18.5 - 0.682 \ b/t$	18
	Flat elements supported on both edges and with an intermediate stiffener		9.2	11	4.0	$12.4 - 0.374 \ b/t$	22	$2020 \ / (b/t)^2$
	Curved elements supported on both edges			10	16	7.7	$17.7 - 0.716 \ \sqrt{R_b/t}$	235
	Curved elements supported on both edges			11	7.3	$12.1 - 0.428 \ \sqrt{R_b/t}$	520	$3290 \ / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$

see Part IA Section 3.4.9.1

see Part IA Section 3.4.9.2

Table 2-13
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5086-H34 Sheet and Plate, Drawn Tube

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		S ₁	S ₂	Allowable Stress, S ≥ S ₂
	Any tension member	gross section net section		21 23	18			
TENSION, axial	Any tension member		1	21 23	18			
	Flat elements in uniform tension		2	21	8.5			
TENSION IN BEAMS, extreme fiber, net section	Round or oval tubes		3	24	10			
	Flat elements in bending in their own plane, symmetric shapes		4	27	11			
BEARING	On rivets and bolts		5	45	36			
	On flat surfaces and pins and on bolts in slotted holes		6	30	24			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, S ≤ S ₁	S ₁	S ₂	Allowable Stress, S ≥ S ₂	
COMPRESSION IN COLUMNS, axial	All columns		7	–	0	90	52600 / (kL/r) ²	
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	–	0	140	52600 / (kL/r) ²	
	Flat elements supported on one edge – columns not buckling about a symmetry axis		8.1	19	4.0	12	141 / (bit)	
	Flat elements supported on both edges		9	8.5	3.9	19	90 / (bit)	
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on one edge and with stiffener on other edge		9.1	19	4.0	16	2020 / (bit) ²	
	Flat elements supported on both edges and with an intermediate stiffener		9.2	8.5	3.9	25	2020 / (bit) ²	
	Curved elements supported on both edges		10	19	7.8	39	449 / (bit)	
			8.5	6.9	61	286 / (bit)		
				see Part IA Section 3.4.9.1				
				see Part IA Section 3.4.9.2				
				19	7.8	22.1 – 0.958 √R _b /t	192	3290 / (R _b /t) (1 + √R _b /t) ² / 35
				8.5	6.9	9.3 – 0.302 √R _b /t	600	3290 / (R _b /t) (1 + √R _b /t) ² / 35

White bars apply to unwelded metal

Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for R_b/t < 20

Table 2-14
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5086-H111 Extrusions


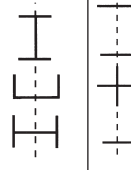
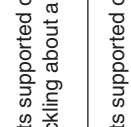
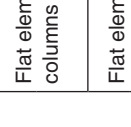

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		S ₁	S ₂	Allowable Stress, S ≥ S ₂
	Any tension member	gross section net section		12.5 18	18			
TENSION, axial	Any tension member		1	12.5 18	18	0	123	52600 / (kL/r) ²
	Flat elements in uniform tension		2	12.5	8.5	0	146	52600 / (kL/r) ²
TENSION IN BEAMS, extreme fiber, net section	Round or oval tubes		3	15	10	4.0	17	103 / (bit)
	Flat elements in bending in their own plane, symmetric shapes		4	17	11	3.9	20	86 / (bit)
BEARING	On rivets and bolts		5	37	36	4.0	22	2020 / (bit) ²
	On flat surfaces and pins and on bolts in slotted holes		6	25	24	3.9	26	2020 / (bit) ²
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, S ≤ S ₁	S ₁	S ₂	Allowable Stress, S ≥ S ₂	
COMPRESSION IN COLUMNS, axial	All columns		7	–	0	123	52600 / (kL/r) ²	
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	11	4.0	17	103 / (bit)	
	Flat elements supported on one edge – columns not buckling about a symmetry axis		8.1	8	3.9	20	86 / (bit)	
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	11	13	53	328 / (bit)	
	Flat elements supported on one edge and with stiffener on other edge		9.1	8	12	63	275 / (bit)	
	Flat elements supported on both edges and with an intermediate stiffener		9.2	11	7.3	340	3290 / ((R _b /t) (1 + √(R _b /t) ²))	
Curved elements supported on both edges		10	8	6.8	620	3290 / ((R _b /t) (1 + √(R _b /t) ²))		

White bars apply to unwelded metal
 Shaded bars apply to weld-affected metal
 For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for R_b/t < 20

see Part IA Section 3.4.9.1

see Part IA Section 3.4.9.2

Table 2-15
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5086-H116, -H32 Sheet and Plate
5086-H32 Drawn Tube

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		
	Any tension member	gross section net section		S_1	S_2	
TENSION, axial	Any tension member	gross section	1	17	18	
	Flat elements in uniform tension	net section	2	21	8.5	
TENSION IN BEAMS, extreme fiber, net section	Round or oval tubes		3	17	8.5	
	Flat elements in bending in their own plane, symmetric shapes		4	20	10	
	On rivets and bolts		5	22	11	
BEARING	On flat surfaces and pins and on bolts in slotted holes		6	41	36	
Type of Stress	Type of Member or Element	Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	S_2	Allowable Stress, $S \geq S_2$
			Sec. 3.4.			
COMPRESSION IN COLUMNS, axial	All columns		7	0	101	$52600 / (kL/r)^2$
			8	0	140	$52600 / (kL/r)^2$
			8.1	16	14	126 / (bit)
			8.1	8.5	19	90 / (bit)
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on one edge – columns not buckling about a symmetry axis		9	16	43	401 / (bit)
			9.1	16	12	286 / (bit)
			9.1	16	13	
			9.1	8.5	61	
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on one edge and with stiffener on other edge		9.1	16	12	
			9.1	16	13	
			9.1	8.5	61	
			9.1	8.5	61	
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges and with an intermediate stiffener		9.2	16	7.7	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
			9.2	8.5	6.9	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
			9.2	16	7.7	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
			9.2	8.5	6.9	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
COMPRESSION IN COLUMN ELEMENTS, gross section	Curved elements supported on both edges		9.2	16	7.7	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
			9.2	8.5	6.9	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
			9.2	16	7.7	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
			9.2	8.5	6.9	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$

White bars apply to unwelded metal


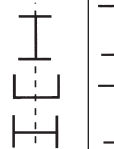


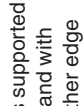
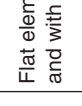

Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b / t < 20$

see Part IA Section 3.4.9.1

see Part IA Section 3.4.9.2

Table 2-16
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5454-H111 Extrusions

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		Allowable Stress, $S_1 < S < S_2$	Allowable Stress, $S \geq S_2$	
	Any tension member	gross section net section		S_1	S_2			
TENSION, axial	Any tension member	gross section net section	1	11.5 17	16			
	Flat elements in uniform tension		2	11.5	7.5			
TENSION IN BEAMS, extreme fiber, net section	Round or oval tubes		3	13.5	8.5			
	Flat elements in bending in their own plane, symmetric shapes		4	15	9.5			
BEARING	On rivets and bolts		5	34	32			
	On flat surfaces and pins and on bolts in slotted holes		6	23	21			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	Allowable Stress, $S \geq S_2$	
COMPRESSION IN COLUMNS, axial	All columns		7	—	0	$9.2 - 0.047 \text{ kL/r}$	$52600 / (kL/r)^2$	
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	9.5	4.0	$10.9 - 0.309 \text{ b/t}$	18	97 / (b/t)
			8.1	6.5	3.7	$7.3 - 0.168 \text{ b/t}$	22	79 / (b/t)
	Flat elements supported on one edge – columns not buckling about a symmetry axis			8.1	9.5	4.0	$10.9 - 0.309 \text{ b/t}$	24
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	9.5	13	$10.9 - 0.097 \text{ b/t}$	56	308 / (b/t)
	Flat elements supported on one edge and with stiffener on other edge		9.1	6.5	12	$7.3 - 0.053 \text{ b/t}$	69	251 / (b/t)
	Flat elements supported on both edges and with an intermediate stiffener		9.2	see Part IA Section 3.4.9.1				
	Curved elements supported on both edges		10	9.5	7.1	$10.7 - 0.363 \sqrt{R_b/t}$	380	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}}{35} \right)$
			6.5	6.4	$7.2 - 0.216 \sqrt{R_b/t}$	680	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}}{35} \right)$	

White bars apply to unwelded metal

Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

Table 2-17
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5454-H32 Sheet and Plate

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress				
	Any tension member	gross section net section		S_1	S_2			
TENSION, axial	Any tension member	gross section net section	1	16 18	16			
	Flat elements in uniform tension		2	16	7.5			
TENSION IN BEAMS, extreme fiber, net section	Round or oval tubes		3	18	8.5			
	Flat elements in bending in their own plane, symmetric shapes		4	20	9.5			
BEARING	On rivets and bolts		5	37	32			
	On flat surfaces and pins and on bolts in slotted holes		6	25	21			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
COMPRESSION IN COLUMNS, axial	All columns		7	-	0	$14.2 - 0.090 \text{ kL/r}$	105	$52600 / (kL/r)^2$
				-	0	$6.8 - 0.030 \text{ kL/r}$	152	$52600 / (kL/r)^2$
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	14.5	4.1	$17.0 - 0.598 \text{ b/t}$	14	$120 / (b/t)$
				7.5	3.8	$8.0 - 0.194 \text{ b/t}$	21	$83 / (b/t)$
	Flat elements supported on one edge – columns not buckling about a symmetry axis		8.1	14.5	4.1	$17.0 - 0.598 \text{ b/t}$	19	$2020 / (b/t)^2$
				7.5	3.8	$8.0 - 0.194 \text{ b/t}$	28	$2020 / (b/t)^2$
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	14.5	13	$17.0 - 0.188 \text{ b/t}$	45	$384 / (b/t)$
				7.5	12	$8.0 - 0.061 \text{ b/t}$	66	$263 / (b/t)$
	Flat elements supported on one edge and with stiffener on other edge		9.1	see Part IA Section 3.4.9.1				
				see Part IA Section 3.4.9.2				
	Flat elements supported on both edges and with an intermediate stiffener		9.2	14.5	7.6	$16.3 - 0.640 \sqrt{R_b/t}$	250	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
				7.5	6.6	$7.9 - 0.243 \sqrt{R_b/t}$	650	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
	Curved elements supported on both edges		10					

White bars apply to unwelded metal
Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b / t < 20$

Table 2-18
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5454-H34 Sheet and Plate

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress				
	Any tension member	gross section net section		S_1	S_2			
TENSION, axial	Any tension member		1	18 20	16			
	Flat elements in uniform tension		2	18	7.5			
TENSION IN BEAMS, extreme fiber, net section	Round or oval tubes		3	21	8.5			
	Flat elements in bending in their own plane, symmetric shapes		4	23	9.5			
	On rivets and bolts		5	40	32			
BEARING	On flat surfaces and pins and on bolts in slotted holes		6	27	21			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
COMPRESSION IN COLUMNS, axial	All columns		7	—	0	$16.1 - 0.109 \text{ kL/r}$	99	$52600 / (kL/r)^2$
			8	16	4.1	$19.3 - 0.726 \text{ b/t}$	13	$128 / (b/t)$
			8.1	7.5	3.8	$8.0 - 0.194 \text{ b/t}$	21	$83 / (b/t)$
			9	16	4.1	$19.3 - 0.726 \text{ b/t}$	18	$2020 / (b/t)^2$
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	7.5	3.8	$8.0 - 0.194 \text{ b/t}$	28	$2020 / (b/t)^2$
			9.1	16	13	$19.3 - 0.228 \text{ b/t}$	42	$409 / (b/t)$
			9.2	7.5	12	$8.0 - 0.061 \text{ b/t}$	66	$263 / (b/t)$
			9.1	see Part IA Section 3.4.9.1				
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on one edge and with stiffener on other edge		9.1	see Part IA Section 3.4.9.1				
			9.2	see Part IA Section 3.4.9.2				
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges and with an intermediate stiffener		9.2	16	7.7	$18.5 - 0.755 \sqrt{R_b/t}$	227	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
			10	7.5	6.6	$7.9 - 0.243 \sqrt{R_b/t}$	650	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
COMPRESSION IN COLUMN ELEMENTS, gross section	Curved elements supported on both edges		10	16	7.7	$18.5 - 0.755 \sqrt{R_b/t}$	227	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
			10	7.5	6.6	$7.9 - 0.243 \sqrt{R_b/t}$	650	$3290 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$

White bars apply to unwelded metal


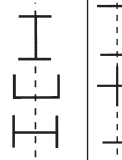

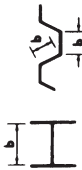
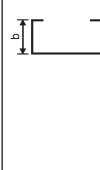

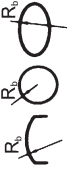
Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b / t < 20$

Table 2-19
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
5456-H116, -H32, -H321 Sheet and Plate
(Thickness 0.188 to 1.250 in.)

White bars apply to unwelded metal
 Shaded bars apply to weld-affected metal

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b / t < 20$


Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		Allowable Stress, $S_1 < S < S_2$	Allowable Stress, $S \geq S_2$	
	Any tension member	gross section net section		S_1	S_2			
TENSION, axial	Any tension member		1	20 24	22			
	Flat elements in uniform tension		2	20	11.5			
	Round or oval tubes		3	23	13.5			
	Flat elements in bending in their own plane, symmetric shapes		4	26	15			
	On rivets and bolts		5	47	43			
	On flat surfaces and pins and on bolts in slotted holes		6	31	29			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	Allowable Stress, $S \geq S_2$	
COMPRESSION IN COLUMNS, axial	All columns		7	–	0	$16.1 - 0.109 \ kL/r$	$52600 \ / (kL/r)^2$	
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	16	4.1	$19.3 - 0.726 \ b/t$	123	$52600 \ / (kL/r)^2$
			8.1	11	4.0	$12.4 - 0.374 \ b/t$	13	$128 \ / (b/t)$
	Flat elements supported on one edge – columns not buckling about a symmetry axis			16	4.1	$19.3 - 0.726 \ b/t$	17	$103 \ / (b/t)$
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	11	4.0	$12.4 - 0.374 \ b/t$	22	$2020 \ / (b/t)^2$
	Flat elements supported on one edge and with stiffener on other edge		9.1	16	13	$19.3 - 0.228 \ b/t$	42	$409 \ / (b/t)$
	Flat elements supported on both edges and with an intermediate stiffener		9.2	11	13	$12.4 - 0.117 \ b/t$	53	$328 \ / (b/t)$
	Curved elements supported on both edges		10	16	7.7	$18.5 - 0.755 \ \sqrt{R_b/t}$	227	$3290 \ / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$
			11	7.3	$12.1 - 0.428 \ \sqrt{R_b/t}$	520	$3290 \ / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$	

see Part IA Section 3.4.9.1

see Part IA Section 3.4.9.2

Table 2-20
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES

6005-T5 Extrusions up through 1.000 in. thick
6105-T5 Extrusions up through 0.500 in. thick

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		Allowable Stress, $S_1 < S < S_2$	Allowable Stress, $S \geq S_2$	
	Any tension member	gross section net section		21 19	12.5 8			
TENSION, axial TENSION IN BEAMS, extreme fiber, net section	Flat elements in uniform tension		1	21 19	12.5 8			
	Round or oval tubes		2	19	8			
	Flat elements in bending in their own plane, symmetric shapes		3	24	9			
BEARING	On rivets and bolts		4	28	10			
	On flat surfaces and pins and on bolts in slotted holes		5	39	25			
			6	26	16			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
COMPRESSION IN COLUMNS, axial	All columns		7	-	0	$20.2 - 0.126 \text{ kL/r}$	66	$51100 / (kL/r)^2$
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	21	2.4	$23.1 - 0.787 \text{ bit}$	10	154 / (bit)
	Flat elements supported on one edge – columns not buckling about a symmetry axis			8	3.8	$8.7 - 0.224 \text{ bit}$	19	85 / (bit)
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	21	2.4	$23.1 - 0.787 \text{ bit}$	12	$1970 / (bit)^2$
	Flat elements supported on one edge and with stiffener on other edge			8	3.8	$8.7 - 0.224 \text{ bit}$	26	$1970 / (bit)^2$
	Flat elements supported on both edges and with an intermediate stiffener		9.1	21	7.6	$23.1 - 0.247 \text{ bit}$	33	491 / (bit)
		9.2	8	12	$8.7 - 0.070 \text{ bit}$	62	271 / (bit)	
		9.1	see Part IA Section 3.4.9.1					
		9.2	see Part IA Section 3.4.9.2					
Curved elements supported on both edges			10	21	1.4	$22.1 - 0.799 \sqrt{R_b/t}$	141	$3190 / \left(\frac{R_b}{t} \right) \left(1 + \sqrt{\frac{R_b/t}{35}} \right)$
			8	6.6	$8.6 - 0.275 \sqrt{R_b/t}$	450	$3190 / \left(\frac{R_b}{t} \right) \left(1 + \sqrt{\frac{R_b/t}{35}} \right)$	

White bars apply to unwelded metal
Shaded bars apply to weld-affected metal
For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

**Table 2-21
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES**

**6061-T6 Sheet, -T651 Plate up through 4.000 in. thick
6061-T6, -T651 Rolled or Cold Finished Rod and Bar
6061-T6 Drawn Tube**

White bars apply to unwelded metal
Shaded bars apply to all thicknesses with fillers 5183, 5356, or 5556 and thicknesses ≤ 0.375 in. with fillers 4043, 5554, or 5654

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
	Any tension member	gross section net section		21 22	12.5			
TENSION, axial	Flat elements in uniform tension		2	21	9			
	Round or oval tubes		3	25	10.5			
	Flat elements in bending in their own plane, symmetric shapes		4	28	12			
	On rivets and bolts		5	43	25			
	On flat surfaces and pins and on bolts in slotted holes		6	29	16			
			6	29	16			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
COMPRESSION IN COLUMNS, axial	All columns		7	-	0	$20.2 - 0.126 kL/r$	66	$51100 / (kL/r)^2$
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	21	2.4	$23.1 - 0.787 b/t$	10	$154 / (b/t)$
	Flat elements supported on one edge – columns not buckling about a symmetry axis		8.1	9	3.9	$10.2 - 0.282 b/t$	18	$92 / (b/t)$
	Flat elements supported on both edges		9	21	7.6	$23.1 - 0.247 b/t$	33	$491 / (b/t)$
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on one edge and with stiffener on other edge		9.1	9	12	$10.2 - 0.089 b/t$	58	$293 / (b/t)$
	Flat elements supported on both edges and with an intermediate stiffener		9.2					
	Curved elements supported on both edges		10	21 9	1.4 6.9	$22.1 - 0.799 \sqrt{R_b/t}$ $10.0 - 0.335 \sqrt{R_b/t}$	141 390	$3190 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$ $3190 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$

see Part IA Section 3.4.9.1

see Part IA Section 3.4.9.2

Table 2-22
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
6061-T6, -T6510, -T6511 Extrusions
6061-T6 Standard Structural Shapes, Pipe
6351-T5 Extrusions

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress		Allowable Stress, $S_1 < S < S_2$	Allowable Stress, $S \geq S_2$	
	Any tension member	gross section net section		1	12.5			
TENSION, axial	Flat elements in uniform tension		2	19	9			
	Round or oval tubes		3	24	10.5			
	Flat elements in bending in their own plane, symmetric shapes		4	28	12			
	On rivets and bolts		5	39	25			
	On flat surfaces and pins and on bolts in slotted holes		6	26	16			
	BEARING							
COMPRESSION IN COLUMNS, axial	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	Allowable Stress, $S \geq S_2$	
	All columns		7	-	0	20.2 - 0.126 kL/r	51100 $/(kL/r)^2$	
	Flat elements supported on one edge - columns buckling about a symmetry axis		8	21	2.4	23.1 - 0.787 b/t	154 $/(b/t)$	
	Flat elements supported on one edge - columns not buckling about a symmetry axis		8.1	9	3.9	10.2 - 0.282 b/t	92 $/(b/t)$	
	Flat elements supported on both edges		9	21	2.4	23.1 - 0.787 b/t	1970 $/(b/t)^2$	
	Flat elements supported on one edge and with stiffener on other edge		9.1	9	3.9	10.2 - 0.282 b/t	1970 $/(b/t)^2$	
	Flat elements supported on both edges and with an intermediate stiffener		9.2	21	1.4	22.1 - 0.799 $\sqrt{R_b/t}$	3190 $/(\frac{R_b}{t}) (1 + \frac{\sqrt{R_b/t}^2}{35})$	
	Curved elements supported on both edges		10	9	6.9	10.0 - 0.335 $\sqrt{R_b/t}$	3190 $/(\frac{R_b}{t}) (1 + \frac{\sqrt{R_b/t}^2}{35})$	
	Flat elements supported on one edge and with stiffener on other edge		9.1	see Part IA Section 3.4.9.1				
	Flat elements supported on both edges and with an intermediate stiffener		9.2	see Part IA Section 3.4.9.2				


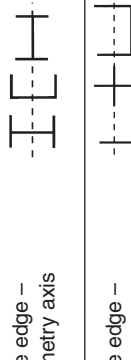
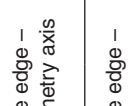
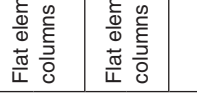

White bars apply to unwelded metal

Shaded bars apply to all thicknesses with fillers 5183, 5356, or 5556 and thicknesses ≤ 0.375 in. with fillers 4043, 5554, or 5654

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

Table 2-23
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES

6063-T5 Extrusions up through 0.500 in. thick
6063-T52 Extrusions up through 1.000 in. thick

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress						
	Any tension member	gross section net section								
TENSION, axial	Any tension member	gross section net section	1	9.5 11.5	8.5					
	Flat elements in uniform tension		2	9.5	4.8					
	Round or oval tubes		3	11.5	5.5					
TENSION IN BEAMS, extreme fiber, net section	Flat elements in bending in their own plane, symmetric shapes		4	12.5	6.5					
	On rivets and bolts		5	23	17					
BEARING	On flat surfaces and pins and on bolts in slotted holes		6	15	11.5					
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$		
COMPRESSION IN COLUMNS, axial	All columns		7	–	0	$8.9 - 0.037 \text{ kL/r}$	99	$51100 / (kL/r)^2$		
			8	Flat elements supported on one edge – columns buckling about a symmetry axis	–	0	$4.5 - 0.016 \text{ kL/r}$	185	$51100 / (kL/r)^2$	
						8.1	Flat elements supported on one edge – columns not buckling about a symmetry axis	9.5	$10.0 - 0.225 \text{ b/t}$	16
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges		9	4.8	3.3	$5.2 - 0.102 \text{ b/t}$	25	$66 / (b/t)$		
				9.5	1.4	$10.0 - 0.225 \text{ b/t}$	18	$1970 / (b/t)^2$		
			9.1	Flat elements supported on one edge and with stiffener on other edge		4.8	3.3	$5.2 - 0.102 \text{ b/t}$	34	$1970 / (b/t)^2$
						9.5	4.6	$10.0 - 0.071 \text{ b/t}$	50	$323 / (b/t)$
						4.8	10	$5.2 - 0.032 \text{ b/t}$	81	$209 / (b/t)$
COMPRESSION IN COLUMN ELEMENTS, gross section	Flat elements supported on both edges and with an intermediate stiffener		9.1	see Part IA Section 3.4.9.1						
			9.2	see Part IA Section 3.4.9.2						
COMPRESSION IN COLUMN ELEMENTS, gross section	Curved elements supported on both edges		9.5	0.3	$9.8 - 0.271 \sqrt{R_b/t}$	280	$3190 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$			
			4.8	5.4	$5.2 - 0.140 \sqrt{R_b/t}$	800	$3190 / \left(\frac{R_b}{t} \right) \left(1 + \frac{\sqrt{R_b/t}^2}{35} \right)$			

White bars apply to unwelded metal

Shaded bars apply to weld-affected material

For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

Table 2-26
ALLOWABLE STRESSES FOR
BUILDING TYPE STRUCTURES
7005-T53 Extrusions

Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress				
	Any tension member	gross section net section		27	21			
TENSION, axial	Flat elements in uniform tension		2	26	14.5			
	Round or oval tubes		3	31	17			
TENSION IN BEAMS, extreme fiber, net section	Flat elements in bending in their own plane, symmetric shapes		4	35	19			
	On rivets and bolts		5	51	41			
BEARING	On flat surfaces and pins and on bolts in slotted holes		6	34	27			
Type of Stress	Type of Member or Element		Sec. 3.4.	Allowable Stress, $S \leq S_1$	S_1	Allowable Stress, $S_1 < S < S_2$	S_2	Allowable Stress, $S \geq S_2$
COMPRESSION IN COLUMNS, axial	All columns		7	–	0	25.1 – 0.171 kL/r	60	53100 $/(kL/r)^2$
	Flat elements supported on one edge – columns buckling about a symmetry axis		8	–	0	14.2 – 0.089 kL/r	106	53100 $/(kL/r)^2$
	Flat elements supported on one edge – columns not buckling about a symmetry axis			26	2.6	28.8 – 1.08 bit	9.4	175 $/(bit)$
	Flat elements supported on both edges		9	14.5	4.1	17.0 – 0.596 bit	14	121 $/(bit)$
	Flat elements supported on one edge and with stiffener on other edge			26	2.6	28.8 – 1.08 bit	11	2040 $/(bit)^2$
	Flat elements supported on both edges		9.1	14.5	4.1	17.0 – 0.596 bit	19	2040 $/(bit)^2$
Flat elements supported on both edges and with an intermediate stiffener		26		8.2	28.8 – 0.337 bit	30	559 $/(bit)$	
COMPRESSION IN COLUMN ELEMENTS, gross section	Curved elements supported on both edges		10	14.5	7.7	16.3 – 0.638 $\sqrt{R_b/t}$	430	3320 $/(\frac{R_b}{t}) (1 + \frac{\sqrt{R_b/t}^2}{35})$
	Flat elements supported on both edges and with an intermediate stiffener			26	1.7	27.4 – 1.05 $\sqrt{R_b/t}$	121	3320 $/(\frac{R_b}{t}) (1 + \frac{\sqrt{R_b/t}^2}{35})$
	Curved elements supported on both edges			14.5	7.7	16.3 – 0.638 $\sqrt{R_b/t}$	430	3320 $/(\frac{R_b}{t}) (1 + \frac{\sqrt{R_b/t}^2}{35})$

White bars apply to unwelded metal
 Shaded bars apply to weld-affected material
 For tubes with circumferential welds, Sections 3.4.10, 3.4.12, and 3.4.16.1 apply for $R_b/t < 20$

see Part IA Section 3.4.9.1

see Part IA Section 3.4.9.2