



Sync-Lok

TWIN FERRULE TUBE FITTINGS
SINGLE FERRULE TUBE FITTINGS

TUBING DATA CHARTS

**COPPER ANNEALED SEAMLESS TUBING
ASTM B-75 OR EQUIVALENT**

ALLOWABLE WORKING PRESSURE

ALLOWABLE STRESS = 6,000 PSI between -20° F and 100° F

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	3,198	3,690	4,056						
3/16	2,034	2,370	2,616	3,774					
1/4	1,476	1,710	1,890	2,760	3,750				
5/16		1,338	1,476	2,154	2,946				
3/8		1,098	1,212	1,752	2,412	3,156			
1/2			888	1,267	1,740	2,298			
5/8			702	1,002	1,362	1,782	2,076		
3/4			582	828	1,116	1,458	1,692	1,974	
7/8			496	702	948	1,230	1,428	1,662	
1			432	612	822	1,068	1,263	1,434	1,590

Factor of Safety = 5, considering tensile strength to be 30,000 PSI at room temperature

CALCULATED BURST PRESSURE

TENSILE STRENGTH = 30,000

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	15,985	18,460	20,270						
3/16	10,175	11,845	13,080	18,865					
1/4	7,380	8,555	9,460	13,805	18,765				
5/16		6,695	7,380	10,760	14,740				
3/8		5,495	6,050	8,755	12,050	15,780			
1/2			4,450	6,380	8,705	11,485			
5/8			3,520	5,020	6,805	8,915	10,385		
3/4			2,910	4,135	5,585	7,285	8,455	9,870	
7/8			2,480	3,520	4,740	6,160	7,135	8,300	
1			2,160	3,060	4,115	5,335	6,170	7,165	7,965

Reference: ANSI B31.3, Table A-1 and Par. 304.1.2

ASME Pressure Vessels, Section VIII,

Table UNF-23.2, Par. UG-27 and Appendix 1, Par. 1-2

**CARBON STEEL ANNEALED SEAMLESS TUBING
ASTM A-179 OR EQUIVALENT**

ALLOWABLE WORKING PRESSURE

ALLOWABLE STRESS = 11,700 PSI between -20° F and 650° F

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	4,294	6,236	7,909						
3/16	2,726	3,966	5,101	7,359	9,688				
1/4		2,878	3,685	5,382	7,312				
5/16		2,258	2,878	4,200	5,745				
3/8			2,363	3,416	4,703	6,154			
1/2			1,732	2,487	3,393	4,481	5,206		
5/8			1,369	1,954	2,656	3,475	4,048		
3/4			1,135	1,615	2,176	2,843	3,299	3,849	
7/8			966	1,396	1,849	2,398	2,785	3,241	
1			842	1,193	1,603	2,083	2,410	2,796	3,100

Factor of Safety = 4, considering tensile strength to be 47,000 PSI at room temperature

CALCULATED BURST PRESSURE

TENSILE STRENGTH = 47,000

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	17,250	25,045	31,755						
3/16	10,960	15,940	20,490	29,560	38,920				
1/4		11,560	14,820	21,630	29,400				
5/16		9,070	11,560	16,855	23,095				
3/8			9,480	13,715	18,880	2,420			
1/2			6,970	9,995	13,640	17,990	20,900		
5/8			5,515	7,865	10,665	13,970	16,265		
3/4			4,560	6,480	8,750	11,410	13,250	15,465	
7/8			3,880	5,515	7,425	9,650	11,175	13,005	
1			3,385	4,795	6,445	8,335	9,665	11,225	12,480

Reference: ANSI B31.3, Table A-1 and Par. 304.1.2

ASME Pressure Vessels, Section VIII,

Table UCS-23, Par. UG-27 and Appendix 1, Par. 1-2

**304 AND 316 STAINLESS STEEL ANNEALED WELDED TUBING
ASTM A-249 OR EQUIVALENT**

ALLOWABLE WORKING PRESSURE

ALLOWABLE STRESS = 15,900 PSI between -20° F and 100° F

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	5,835	8,475	10,748						
3/16	3,705	5,390	6,932	10,001					
1/4		3,911	5,009	7,314	9,938				
5/16		3,069	3,911	5,708	7,807				
3/8			3,212	4,643	6,392				
1/2			2,353	3,380	4,611	6,090			
5/8			1,860	2,655	3,609	4,722	5,501		
3/4			1,542	2,194	2,957	3,864	4,484	5,231	5,835
7/8			1,313	1,860	2,512	3,260	3,784	4,404	4,897
1			1,145	1,622	2,175	2,830	3,275	3,800	4,214

Factor of Safety = 4, considering tensile strength to be 75,000 PSI at room temperature, and a weld joint efficiency factor of approximately 0.85

CALCULATED BURST PRESSURE

TENSILE STRENGTH = 75,000

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	27,525	39,970	50,670						
3/16	17,490	25,440	32,700	47,170					
1/4		18,450	23,650	34,515	46,915				
5/16		14,475	18,600	26,895	36,855				
3/8			15,130	21,885	30,130				
1/2			11,125	15,955	21,765	28,710			
5/8			8,800	12,550	17,020	22,290	25,960		
3/4			7,275	10,345	13,965	18,210	21,145	24,675	27,525
7/8			6,195	8,800	11,850	15,400	17,835	20,755	23,110
1			5,400	7,650	10,285	13,335	15,420	17,910	19,915

Reference: ANSI B31.3, Table A-1 and Par. 304.1.2
ASME Pressure Vessels, Section VIII,
Table UHF-23, Par. UG-27 and Appendix 1, Par. 1-2

**304 AND 316 STAINLESS STEEL ANNEALED SEAMLESS TUBING
ASTM A-213 OR EQUIVALENT**

ALLOWABLE WORKING PRESSURE

ALLOWABLE STRESS = 18,700 PSI between -20° F and 100° F

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	6,863	9,967	12,641						
3/16	4,357	6,339	8,153	11,762					
1/4		4,600	5,891	8,602	11,688				
5/16		3,609	4,600	6,713	9,182				
3/8			3,777	5,460	7,515				
1/2			2,768	3,976	5,423	7,162			
5/8			2,188	3,123	4,245	5,554	6,470		
3/4			1,814	2,581	3,478	4,544	5,273	6,152	6,863
7/8			1,545	2,188	2,955	3,834	4,451	5,180	5,760
1			1,346	1,907	2,562	3,329	3,852	4,469	4,956

Factor of Safety = 4, considering tensile strength to be 75,000 PSI at room temperature

CALCULATED BURST PRESSURE

TENSILE STRENGTH = 75,000

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	27,525	39,970	50,670						
3/16	17,490	25,440	32,700	47,170					
1/4		18,450	23,650	34,515	46,915				
5/16		14,475	18,600	26,895	36,855				
3/8			15,130	21,885	30,130				
1/2			11,125	15,955	21,765	28,710			
5/8			8,800	12,550	17,020	22,290	25,960		
3/4			7,275	10,345	13,965	18,210	21,145	24,675	27,525
7/8			6,195	8,800	11,850	15,400	17,835	20,755	23,110
1			5,400	7,650	10,285	13,335	15,420	17,910	19,915

Reference: ANSI B31.3, Table A-1 and Par. 304.1.2

ASME Pressure Vessels, Section VIII,

Table UHA-23, Par. UG-27 and Appendix 1, Par. 1-2

**MONEL[®] 400 (NICKEL-COPPER) ANNEALED SEAMLESS TUBING
ASTM B-165 OR EQUIVALENT**

ALLOWABLE WORKING PRESSURE

ALLOWABLE STRESS = 17,500 PSI between -20° F and 100° F

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	6,422	9,325	11,823						
3/16	4,081	5,935	7,630	11,005					
1/4		4,305	5,518	8,053	10,946				
5/16		3,378	4,305	6,275	8,598				
3/8			3,530	5,107	7,029				
1/2			2,595	3,721	5,078	6,699			
5/8			2,051	2,927	3,970	5,200	6,056		
3/4			1,696	2,412	3,259	4,249	4,933	5,755	6,422
7/8			1,446	2,051	2,764	3,592	4,161	4,842	5,391
1			1,260	1,784	2,399	3,111	3,598	4,179	4,646

Factor of Safety = 4, considering tensile strength to be 70,000 PSI at room temperature

CALCULATED BURST PRESSURE

TENSILE STRENGTH = 70,000

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	25,690	37,300	47,290						
3/16	16,325	23,745	30,520	44,025					
1/4		17,220	22,070	32,215	43,785				
5/16		13,510	17,220	25,100	34,400				
3/8			14,120	20,425	28,120				
1/2			10,380	14,890	20,315	26,795			
5/8			8,210	11,710	15,885	20,805	24,225		
3/4			6,790	9,655	13,035	16,995	19,735	23,030	25,690
7/8			5,780	8,210	11,060	14,370	16,645	19,370	21,565
1			5,040	7,140	9,595	12,445	14,390	16,715	18,585

Reference: ANSI B31.3, Table A-1 and Par. 304.1.2

ASME Pressure Vessels, Section VIII,

Table UNF-23.3, Par. UG-27 and Appendix 1, Par. 1-2

**INCONEL® 600 (NICKEL-CHROMIUM-IRON) ANNEALED SEAMLESS TUBING
ASTM B-167 OR EQUIVALENT**

ALLOWABLE WORKING PRESSURE

ALLOWABLE STRESS = 20,00 PSI between -20° F and 800° F

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	7,340	10,658	13,510						
3/16	4,664	6,784	8,720	12,578					
1/4		4,920	6,306	9,204	12,510				
5/16		3,860	4,920	7,172	9,828				
3/8			4,034	5,836	8,034	10,520			
1/2			2,966	4,254	5,804	7,656			
5/8			2,346	3,346	4,538	5,944	6,922		
3/4			1,940	2,758	3,724	4,856	5,638	6,580	7,340
7/8			1,652	2,346	3,160	4,106	4,756	5,534	6,162
1			1,440	2,040	2,742	3,556	4,115	4,776	5,310

Factor of Safety = 4, considering tensile strength to be 80,000 PSI at room temperature

CALCULATED BURST PRESSURE

TENSILE STRENGTH = 80,000

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	29,360	42,630	54,050						
3/16	18,655	27,135	34,880	50,310					
1/4		19,680	25,225	36,815	50,404				
5/16		15,440	19,680	28,690	39,310				
3/8			16,135	23,345	32,135	42,080			
1/2			11,865	17,015	23,215	30,625			
5/8			9,385	13,385	18,150	23,775	27,690		
3/4			7,760	11,030	14,895	19,425	22,550	26,320	29,360
7/8			6,610	9,385	12,640	16,425	19,025	22,135	24,650
1			5,760	8,160	10,970	14,225	16,450	19,105	21,240

Reference: ANSI B31.3, Table A-1 and Par. 304.1.2

ASME Pressure Vessels, Section VIII,

Table UNF-23.3, Par. UG-27 and Appendix 1, Par. 1-2

**HASTELLOY® C-276 (NICKEL-MOLYBDENUM-CHROMIUM) SOLUTION
ANNEALED SEAMLESS TUBING
ASTM B-622 OR EQUIVALENT**

ALLOWABLE WORKING PRESSURE

ALLOWABLE STRESS = 25,00 PSI between -20° F and 300° F

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	9,175	13,322	16,887						
3/16	5,830	8,480	10,900	15,722					
1/4		6,150	7,882	11,505	15,637				
5/16		4,825	6,150	8,965	12,285				
3/8			5,042	7,295	10,042				
1/2			3,707	5,317	7,255	9,570			
5/8			2,932	4,182	5,672	7,430	8,652		
3/4			2,425	3,447	4,655	6,070	7,047	8,225	9,175
7/8			2,065	2,932	3,950	5,132	5,945	6,917	7,702
1			1,800	2,550	3,427	4,445	5,140	5,970	6,637

Factor of Safety = 4, considering tensile strength to be 100,000 PSI at room temperature

CALCULATED BURST PRESSURE

TENSILE STRENGTH = 100,000

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	36,700	53,290	67,560						
3/16	23,320	33,920	43,600	62,890					
1/4		24,600	31,530	46,020	62,550				
5/16		19,300	24,600	35,860	49,140				
3/8			20,170	29,180	40,170				
1/2			14,830	21,270	29,020	38,280			
5/8			11,730	16,730	22,690	29,720	34,610		
3/4			9,700	13,790	18,620	24,280	28,190	32,900	36,700
7/8			8,260	11,730	15,800	20,530	23,780	27,670	30,810
1			7,200	10,200	13,710	17,780	20,560	23,880	26,550

Reference: ANSI B31.3, Table A-1 and Par. 304.1.2

ASME Pressure Vessels, Section VIII,

Table UNF-23.3, Par. UG-27 and Appendix 1, Par. 1-2

**HASTELLOY® C-276 (NICKEL-MOLYBDENUM-CHROMIUM) SOLUTION
ANNEALED WELDED TUBING
ASTM B-626 OR EQUIVALENT**

ALLOWABLE WORKING PRESSURE

ALLOWABLE STRESS = 21,20 PSI between -20° F and 300° F

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	7,780	11,297	14,322						
3/16	4,943	7,191	9,243	13,332					
1/4		5,215	6,684	9,756	13,260				
5/16		4,091	5,215	7,602	10,417				
3/8			4,276	6,186	8,516				
1/2			3,143	4,509	6,152	8,115			
5/8			2,486	3,546	4,810	6,300	7,337		
3/4			2,056	2,923	3,947	5,147	5,976	6,974	7,780
7/8			1,751	2,486	3,349	4,352	5,041	5,866	6,531
1			1,526	2,162	2,906	3,769	4,358	5,062	5,628

Factor of Safety = 4, considering tensile strength to be 100,000 PSI at room temperature, and a weld joint efficiency factor of approximately 0.85

CALCULATED BURST PRESSURE

TENSILE STRENGTH = 100,000

WALL THICKNESS									
Tubing O.D	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	36,700	53,290	67,560						
3/16	23,320	33,920	43,600	62,890					
1/4		24,600	31,530	46,020	62,550				
5/16		19,300	24,600	35,860	49,140				
3/8			20,170	29,180	40,170				
1/2			14,830	21,270	29,020	38,280			
5/8			11,730	16,730	22,690	29,720	34,610		
3/4			9,700	13,790	18,620	24,280	28,190	32,900	36,700
7/8			8,260	11,730	15,800	20,530	23,780	27,670	30,810
1			7,200	10,200	13,710	17,780	20,560	23,880	26,550

Reference: ASME Pressure Vessels, Section VIII,

Table UNF-23.3, Par. UG-27 and Appendix 1, Par. 1-2

ALLOWABLE STRESS VALUES FOR MATERIALS AT VARIOUS TEMPERATURES

VALUES IN ksi (PSI = ksi x 1000)

Temperature	Copper Seamless Annealed Tubing Spec. ASTM B-75	Carbon Steel Seamless Annealed Tubing Spec. ASTM A-179	Stainless Steel				MONEL® 400 Seamless Annealed Tubing Spec. ASTM B-165	INCONEL® 600 Seamless Annealed Tubing Spec. ASTM B-167	HASTELLOY® C-276	
			Type 304		Type 316				Seamless Annealed Tubing Spec. ASTM B-622	Welded Annealed Tubing Spec. ASTM B-626
			Seamless Annealed Tubing Spec. ASTM A-213	Welded Annealed Tubing Spec. ASTM A-249	Seamless Annealed Tubing Spec. ASTM A-213	Welded Annealed Tubing Spec. ASTM A-249				
-20 to 100	6.0	11.7	18.7	15.9	18.7	15.9	17.5	20.0	25.0	21.2
150	5.1	11.7	18.25	15.5	18.7	15.9	16.95	20.0	25.0	21.2
200	4.8	11.7	17.8	15.1	18.7	15.9	16.4	20.0	25.0	21.2
250	4.8	11.7	17.2	14.6	18.55	15.75	15.9	20.0	25.0	21.2
300	4.7	11.7	16.6	14.1	18.4	15.6	15.4	20.0	25.0	21.2
350	4.0	11.7	16.35	13.9	18.2	15.45	15.1	20.0	24.65	20.95
400	3.0	11.7	16.1	13.7	18.0	15.3	14.8	20.0	24.3	20.7
450		11.7	16.0	13.6	18.0	15.3	14.75	20.0	24.1	20.5
500		11.7	15.9	13.5	18.0	15.3	14.7	20.0	23.9	20.3
600		11.7	15.9	13.5	17.0	14.4	14.7	20.0	23.5	20.0
650		11.7	15.9	13.5	16.7	14.2	14.7	20.0	23.3	19.8
700		11.7	15.9	13.5	16.3	13.9	14.7	20.0	23.1	19.6
750		11.5	15.6	13.2	16.1	13.7	14.6	20.0	22.9	19.5
800		10.6	15.1	12.9	15.8	13.4	14.2	20.0	22.8	19.4
850		9.2*	14.9	12.7	15.7	13.4	11.0	19.6	22.6	19.2
900		7.9*	14.7	12.5	15.6	13.2	8.0	16.0	22.3	18.9
950		6.5*	14.4	12.2	15.4	13.1		10.6	22.1	18.8
1000			14.1	11.7	15.3	13.0		7.0	21.8	18.5
1050			12.4	10.4	15.1	12.8		4.5	18.5	15.7
1150			9.8	8.3	12.4	10.5		3.0	15.0	12.7
1200			6.1	5.2	7.4	6.3		2.2	9.8	8.3
1250			4.7	4.0	5.5	4.7		2.0	7.8	6.6
1300			3.7	3.2	4.1	3.5				
1350			2.9	2.5	3.1	2.6				
1400			2.3	2.0	2.3	1.9				
1450			1.8	1.6	1.7	1.5				
1500			1.4	1.2	1.3	1.1				
Min. Tensile Strength (ksi) at 100°F	30.0	47.0	75.0	75.0	75.0	75.0	70.0	80.0	100.0	100.0
Min. Yield Strength (ksi) at 100°F	9.0	26.0	30.0	30.0	30.0	30.0	28.0	35.0	41.0	41.0

* Prolonged exposure to temperatures above 800°F may cause the carbides to convert to graphite. Above allowable stress values extracted from ASME Pressure Vessels Section VIII and ANSI B31.3 Chemical Plant and Petroleum Refinery Piping, a section of the ASME Code for Pressure Piping with the permission of the publisher ASME.

CALCULATION FACTOR TABLE USE FACTORS TO CALCULATE YIELD, BURST AND ALLOWABLE WORKING PRESSURE

1. Allowable Working Pressure = Factor X Allowable Stress Value (PSI)
2. Calculated Yield Pressure = Factor X Minimum Yield Strength (PSI)
3. Calculated Burst Pressure = Factor X Minimum Tensile Strength (PSI)

See table of "Allowable Stress Values for Material at Various Temperatures" (Page 10)

TUBING WALL THICKNESS											
Tubing O.D.	.016	.020	.028	.032	.035	.049	.065	.083	.095	.109	.120
1/8	0.285	0.367	0.533	0.615	.6756*						
3/16	0.183	0.233	0.339	0.395	0.436	.6289*					
1/4	0.135	0.171	0.246	0.285	0.315	0.460	.6255*				
5/16		0.135	0.193	0.223	0.246	0.359	0.491				
3/8			0.151	0.183	0.202	0.292	0.402	0.526			
1/2			0.117	0.135	0.148	0.213	0.290	0.383	0.445		
5/8					0.117	0.167	0.227	0.297	0.346	0.405	
3/4					0.097	0.138	0.186	0.243	0.282	0.329	0.367
7/8					0.083	0.117	0.158	0.205	0.238	0.277	0.308
1					0.072	0.102	0.137	0.178	0.206	0.239	0.266

Factor to left of heavy black line were calculated using the "Boardman Formula", those to the right were calculated using the "Lame Formula".

Chart Factors have been established per "ASME Boiler and Pressure Vessel Code, Pressure Vessels, Section VIII - Par. UG-27 and Appendix 1, Par. 1-2", and ASME Code for Pressure Piping, Chemical Plant and Petroleum Refinery Piping, ANSI B31.3. Par. 304.1.2.

* Factors marked with * are not covered by ANSI B31.3

How To Use "THE CALCULATION FACTOR TABLE"

The values listed on the "CALCULATION FACTOR TABLE" may be used to determine the allowable pressure, yield pressure, burst pressure or any other pressure for which a stress value is available. Stress values may be obtained from "ALLOWABLE STRESS VALUES FOR MATERIALS AT VARIOUS TEMPERATURES" table or other sources. This table can prove quite useful in calculating allowable burst pressures of tubes not included on the prepared tables. This would include different materials as well as materials at various temperatures.

The following example illustrates the proper use of the "CALCULATION FACTOR TABLE"

Suppose that you want to know the maximum allowable pressure of 304 S. Steel seamless, ASTM A-213, 1/4" O.D by .035 wall tubing with a fluid temperature of 100°F. This information can be directly obtained from the table "ALLOWABLE WORKING PRESSURE - 304 STAINLESS STEEL" or calculated as follows:

First: Find the factor (K) corresponding to 1/4" O.D. x .035 wall on the "CALCULATION FACTOR TABLE".
K = .3153

Second: Find the allowable stress (S_A) for 304 S. Steel at 100°F on the "ALLOWABLE STRESS VALUES FOR MATERIALS AT VARIOUS TEMPERATURES".

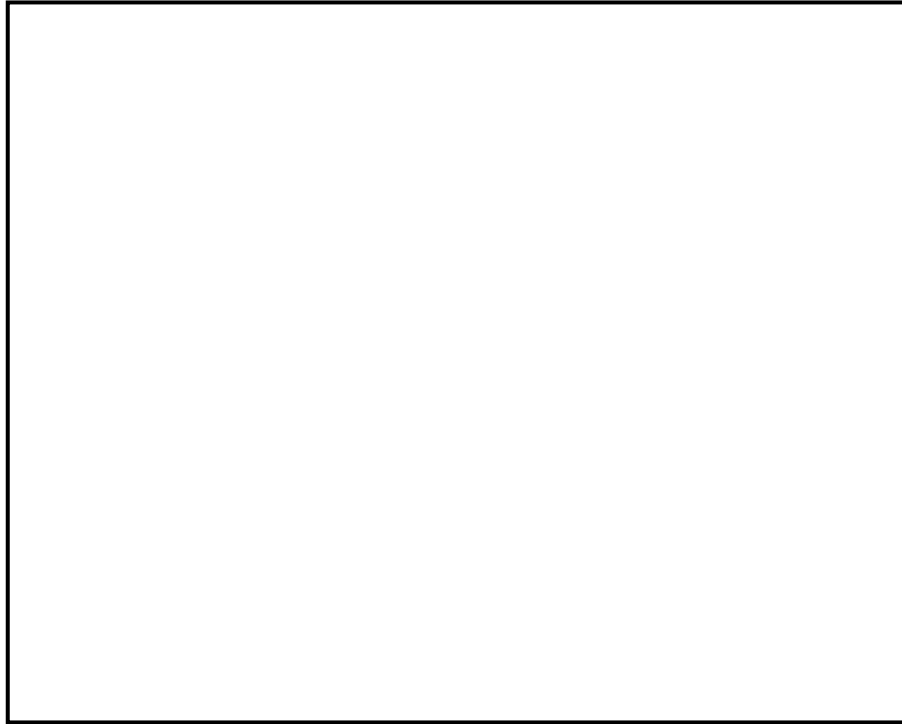
$$S_A = 18,700 \text{ PSI}$$

Third: According to "CALCULATION FACTOR TABLE", Allowable Working Pressure (P_A) = Factor (K) = Allowable Stress (S) Value in PSI.

$$\text{Therefore, } P_A = K \times S_A$$

$$P_A = .3153 \times 18,700 \text{ PSI}$$

$$P_A = 5890 \text{ PSI (Max, Allowable Pressure at 100°F)}$$



Sync-Lok

***407 Newburg Avenue
Catonsville, MD 21228-5833
Phone: 410-869-3480
Fax: 410-869-3482
E-mail: info@sync-lok.com
Web: www.sync-lok.com***

***6 Janice Street
Stanhope, NJ 07874
Phone: 973-810-2773
Fax: 973-810-2774
E-mail: info@sync-lok.com
Web: www.sync-lok.com***