

DAFTAR PUSTAKA

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PROPERTIES OF MATERIALS CARBON & LOW ALLOY STEEL Maximum Allowable Stress Values in Tension 1000 psi. *												
Specification		For Metal Temperature Not Exceeding Deg. F.										
Number	Grade	-20 to 650	700	750	800	850	900	950	1050	1100	1150	1200
SA-283	C	12.7	-	-	-	-	-	-	-	-	-	-
SA-285	C	13.8	13.3	12.1	10.2	8.4	6.5	-	-	-	-	-
SA-515	55	13.8	13.3	12.1	10.2	8.4	6.5	4.5	2.5	-	-	-
SA-515	60	15.0	14.4	13.0	10.8	8.7	6.5	4.5	2.5	-	-	-
SA-515	65	16.3	15.5	13.9	11.4	9.0	6.5	4.5	2.5	-	-	-
SA-515	70	17.5	16.6	14.8	12.0	9.3	6.5	4.5	2.5	-	-	-
SA-516	55	13.8	13.3	12.1	10.2	8.4	6.5	4.5	2.5	-	-	-
SA-516	60	15.0	14.4	13.0	10.8	8.7	6.5	4.5	2.5	-	-	-
SA-516	65	16.3	15.5	13.9	11.4	9.0	6.5	4.5	2.5	-	-	-
SA-516	70	17.5	16.6	14.8	12.0	9.3	6.5	4.5	2.5	-	-	-
SA-105		17.5	16.6	14.8	12.0	9.3	6.5	4.5	2.5	-	-	-
SA-181	I	15.0	14.4	13.0	10.8	8.7	6.5	4.5	2.5	-	-	-
SA-350	LF1	15.0	14.4	13.0	10.8	7.8	5.0	3.0	1.5	-	-	-
	LF2	17.5	16.6	14.8	12.0	7.8	5.0	3.0	1.5	-	-	-
SA-53	B	15.0	14.4	13.0	10.8	8.7	6.5	-	-	-	-	-
SA-106	B	15.0	14.4	13.0	10.8	8.7	6.5	4.5	2.5	-	-	-
SA-193	B7 $\leq 2\frac{1}{2}$ "	25.0	25.0	23.6	21.0	17.0	12.5	8.5	4.5	-	-	-
SA-194	2H	-	-	-	-	-	-	-	-	-	-	-
SA-307	B		-	-	-	-	-	-	-	-	-	-



TABLE UCS-23 (CONT'D)
MAXIMUM ALLOWABLE STRESS VALUES IN TENSION FOR CARBON AND LOW ALLOY
(Caution: See UW-12 for vessels constructed under Part UW)

Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temp., °F, Not Exceeding												Spec. No.	Ext. Press. Chart Fig. No.
650	700	750	800	850	900	950	1000	1050	1100	1150	1200		
												Carbon Steel Plates and Sheets	
12.7	...	...	...	...	...	...	...	...	...	...	...	SA-36	5-UCS-28.2
10.4	...	...	...	...	...	...	...	...	...	...	...	SA-283	5-UCS-28.1
11.5	...	...	...	...	...	...	...	...	...	...	...	SA-283	
12.7	...	...	...	...	...	...	...	...	...	...	...	SA-283	
12.7	...	...	...	...	...	...	...	...	...	...	...	SA-283	
11.3	11.0	10.3	9.0	7.8	6.5	...	...	...	...	...	...	SA-285	5-UCS-28.1
12.5	12.1	11.2	9.6	8.1	6.5	...	...	...	...	...	...	SA-285	5-UCS-28.1
13.8	13.3	12.1	10.2	8.4	6.5	...	...	...	...	...	...	SA-285	5-UCS-28.2
18.8	17.7	15.7	12.6	9.6	6.5	4.5	2.5	...	...	...	...	SA-299	5-UCS-28.3
11.3	11.0	10.3	9.0	7.8	6.5	...	...	...	...	...	...	SA-414	5-UCS-28.1
12.5	12.1	11.2	9.6	8.1	6.5	...	...	...	...	...	...	SA-414	5-UCS-28.2
13.8	13.3	12.1	10.2	8.4	6.5	...	...	...	...	...	...		
15.0	14.3	12.9	10.8	8.6	6.5	...	...	...	...	...	...		
16.2	15.5	13.8	11.4	8.9	6.5	...	...	...	...	...	...		
17.5	16.6	14.7	12.0	9.2	6.5	...	...	...	...	...	...	SA-414	5-UCS-28.3
18.8	17.7	15.7	12.6	9.6	6.5	...	...	...	...	...	...		
13.8	13.3	12.1	10.2	8.4	...	...	...	...	...	...	...	SA-442	5-UCS-28.2
15.0	14.4	13.0	10.8	8.7	...	...	...	...	...	...	...		
18.8	...	...	...	...	...	...	...	...	...	...	...	SA-455	5-UCS-28.2
18.3	...	...	...	...	...	...	...	...	...	...	...		
17.5	...	...	...	...	...	...	...	...	...	...	...		
13.8	13.3	12.1	10.2	8.4	6.5	4.5	2.5	...	...	...	...	SA-515	5-UCS-28.2
15.0	14.4	13.0	10.8	8.7	6.5	4.5	2.5	...	...	...	...		
16.3	15.5	13.9	11.4	9.0	6.5	4.5	2.5	...	...	...	...		
17.5	16.6	14.8	12.0	9.3	6.5	4.5	2.5	...	...	...	...		
13.8	13.3	12.1	10.2	8.4	6.5	4.5	2.5	...	...	...	...	SA-516	5-UCS-28.2
15.0	14.4	13.0	10.8	8.7	6.5	4.5	2.5	...	...	...	...		
16.3	15.5	13.9	11.4	9.0	6.5	4.5	2.5	...	...	...	...		
17.5	16.6	14.8	12.0	9.3	6.5	4.5	2.5	...	...	...	...		



TABLE UCS-23 (CONT'D)
MAXIMUM ALLOWABLE STRESS VALUES IN TENSION FOR CARBON AND LOW ALLOY STEEL
(Caution: See UW-12 for vessels constructed under Part UW)

Spec. No.	Grade	Nominal Composition	P- No.	Group No.	Notes	Specified Min. Yield ksi	Specified Min. Tensile, ksi
Carbon Steel Plates and Sheets							
SA-36	...	C-Mn-Si	1	1	(1)(2)(3)(17)	36	58
SA-283	A	C	1	1	(1)(2)	34	45
	B	C	1	1	(1)(2)	37	50
	C	C	1	1	(1)(2)	30	55
	D	C	1	1	(1)(2)	33	60
SA-285	A	C	1	1	(3)(17)(22)	34	45
	B	C	1	1	(3)(17)(22)	37	50
	C	C	1	1	(3)(17)(22)	30	55
SA-299	...	C-Mn-Si	1	2	(17)	40-42	75
SA-414	A	C	1	1	(3)(17)	35	45
	B	C	1	1	(3)(17)	30	50
	C	C	1	1	(3)(17)	33	55
	D	C-Mn	1	1	(3)(17)	35	60
	E	C-Mn	1	1	(3)(17)	38	65
	F	C-Mn	1	2	(3)(17)	42	70
	G	C-Mn	1	2	(3)(17)	45	75
SA-442	55	C-Mn-Si	1	1	(17)	30	55
	60	C-Mn-Si	1	1	(17)	32	60
SA-455	Up to 0.375 in. incl.	C-Mn	1	2	(19)	38	75
	Over 0.375 in. to 0.580 in. incl.	C-Mn	1	2	(16)	37	73
	Over 0.580 in. to 0.750 in. incl.	C-Mn	1	2	...	35	70
SA-515	55	C-Si	1	1	(17)	30	55
	60	C-Si	1	1	(17)	32	60
	65	C-Si	1	1	(17)	35	65
	70	C-Si	1	2	(17)	38	70
SA-516	55	C-Si	1	1	(17)	30	55
	60	C-Mn-Si	1	1	(17)	32	60
	65	C-Mn-Si	1	1	(17)	35	65
	70	C-Mn-Si	1	2	(17)	38	70



MATERIAL SELECTION GUIDE

Design Temperature, °F		Material	Plate	Pipe	Forgings	Fittings	Bolting
Cryogenic	- 425 to - 321	Stainless steel	SA-240- 304, 304L, 347, 316, 316L	SA-312- 304, 304L, 347, 316, 316L	SA-182- 304, 304L, 347, 316, 316L	SA-403 304, 304L, 347, 316, 316L	SA-320-B8 with SA-194-8
	- 320 to - 151	9 nickel	SA-353	SA-333-8	SA-522-I	SA-420-WPL8	
Low temperature	- 150 to - 76	3½ nickel	SA-203-D	SA-333-3	SA-350-LF63	SA-420-WPL3	SA-320-L7 with SA-194-4
	- 75 to - 51	2½ nickel	SA-203-A				
	- 50 to - 21	Carbon steel	SA-516-55, 60 to SA-20	SA-333-6	SA-350-LF2	SA-420-WPL6	SA-193-B7 with SA-194-2H
	- 20 to 4		SA-516-AII	SA-333-1 or 6			
	5 to 32		SA-285-C	SA-53-8 SA-106-B	SA-105 SA-181-60,70	SA-234-WPB	
	33 to 60 61 to 775		SA-516-AII SA-515-AII SA-455-II				
Intermediate							
Temperature	776 to 875	C-½Mo	SA-204-B	SA-335-P1	SA-182-F1	SA-234-WP1	with SA-193-B5 SA-194-3
	876 to 1000	1Cr-½Mo	SA-387-12-1	SA-335-P12	SA-182-F12	SA-234-WP12	
		1½Cr-½Mo	SA-387-11-2	SA-335-P11	SA-182-F11	SA-234-WP11	
	1001 to 1100	2¼Cr-1Mo	SA-387-22-1	SA-335-P22	SA-182-F22	SA-234-WP22	
Elevated	1101 to 1500	Stainless steel	SA-240-347H	SA-312-347H	SA-182-347H	SA-403-347H	SA-193-B8 with SA-194-8
		Incoloy	SB-424	SB-423	SB-425	SB-366	
	Above 1500	Inconel	SB-443	SB-444	SB-446	SB-366	

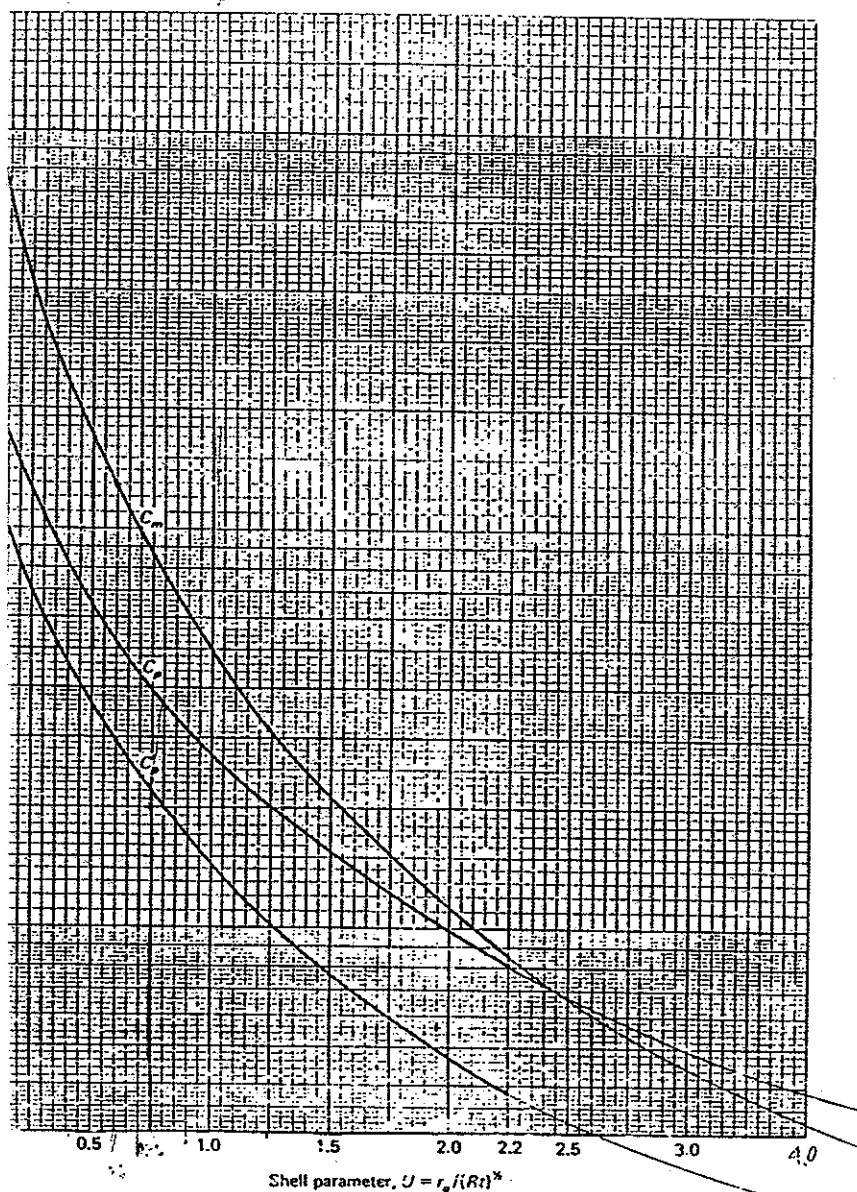


Fig. 7.3. Stress factors C_p , C_r , and C_m for spherical shells.

SPECIFIC GRAVITIES

METALS 62°F.

Aluminum	2.70
Arsimony	6.618
Barium	3.78
Bismuth	9.781
Boron	2.535
Brass: 80C., 20Z	8.60
70C., 30Z	8.44
60C., 40Z	8.36
50C., 50Z	8.20
Bronze: 90C., 10T	8.78
Cadmium	8.648
Calcium	1.54
Chromium	6.93
Cobalt	8.71
Copper	8.89
Gold	19.3
Iridium	22.42
Iron, cast	7.03-7.73
Iron, wrought	7.80-7.90
Lead	11.342
Magnesium	1.741
Manganese	7.3
Mercury (68°F.)	13.546
Molybdenum	10.2
Nickel	8.8
Platinum	21.37
Potassium	0.870
Silver	10.42-10.53
Sodium	0.9712
Steel	7.83
Tantalum	16.6
Tellurium	6.25
Tin	7.29
Titanium	4.5
Tungsten	18.6-19.1
Uranium	18.7
Vanadium	5.6
Zinc	7.04-7.16

HYDROCARBONS 60/60°F.

Ethane	0.3564
Propane	0.3077
N-butane	0.3844
Iso-butane	0.3631
N-pentane	0.6310
Iso-pentane	0.6247
N-hexane	0.6640
2-methylpentane	0.6379
3-methylpentane	0.6689
2,2-dimethylbutane (isooctane)	0.6340
2,3-dimethylbutane	0.6664
N-heptane	0.6882
2-methylheptane	0.6830
3-methylheptane	0.6917
2,2-dimethylpentane	0.6782
2,4-dimethylpentane	0.6773
1,1-dimethylcyclopentane	0.7592
N-octane	0.7064
Cyclopentane	0.7504
Methylcyclopentane	0.7536
Cyclohexane	0.7834
Methylcyclohexane	0.7747
Benzene	0.784
Toluene	0.8718

LIQUIDS 62°F.

Acetic acid	1.06	Muriatic acid	1.20
Alcohol, commercial	0.83	Naphtha	0.76
Alcohol, pure	0.79	Nitric acid	1.50
Ammonia	0.89	Olive oil	0.92
Benzine	0.69	Palm oil	0.97
Bromine	2.97	Petroleum oil	0.82
Carbolic acid	0.96	Phosphoric acid	1.78
Carbon disulphide	1.26	Rape oil	0.92
Cotton-seed oil	0.93	Sulphuric acid	1.84
Ether, sulphuric	0.72	Tar	1.00
Fluoric acid	1.50	Turpentine oil	0.87
Gasoline	0.70	Vinegar	1.06
Kerosene	0.80	Water	1.00
Linseed oil	0.94	Water, sea	1.03
Mineral oil	0.92	Whale oil	0.92

GASES 32°F.

Air	1.000
Acetylene	0.920
Alcohol vapor	1.601
Ammonia	0.592
Carbon dioxide	1.520
Carbon monoxide	0.967
Chlorine	2.423
Ether vapor	2.586
Ethylene	0.967
Hydrofluoric acid	1.261
Hydrogen	0.069
Illuminating gas	0.400
Mercury vapor	6.940
Marsh gas	0.555
Nitrogen	0.971
Nitric oxide	1.039
Nitrous oxide	1.527
Oxygen	1.106
Sulphur dioxide	2.250
Water vapor	0.623

MISCELLANEOUS SOLIDS 62°F.

Asbestos	2.4	Gypsum	2.4
Asphaltum	1.4	Ice	0.9
Borax	1.8	Iron slag	2.7
Brick, common	1.8	Limestone	2.6
Brick, fire	2.3	Marble	2.7
Brick, hard	2.0	Masonry	2.4
Brick, pressed	2.2	Mica	2.8
Brick-work, in mortar	1.6	Mortar	1.5
Brick-work, in cement	1.8	Phosphorus	1.8
Cement	3.1	Plaster of Paris	1.8
Portland (set)	3.1	Quartz	2.6
Chalk	2.3	Sand, dry	1.6
Charcoal	0.4	Sand, wet	2.0
Coal, anthracite	1.3	Sandstone	2.3
Coal, bituminous	1.3	Slate	2.8
Concrete	2.2	Soapstone	2.7
Earth, dry	1.2	Sulphur	2.0
Earth, wet	1.7	Tar, bituminous	1.2
Emery	4.0	Tile	1.8
Glass	2.6	Trap rock	3.0
Granite	2.7		

Specific gravity of solids and liquids is the ratio of their density to the density of water at a specified temperature.

Specific gravity of gases is the ratio of their density to the density of air at standard conditions of pressure and temperature.

To find the weight per cubic foot of a material, multiply the specific gravity by 62.36. EXAMPLE: — The weight of a cubic foot of gasoline $62.36 \times 0.7 = 43.65$ lbs.

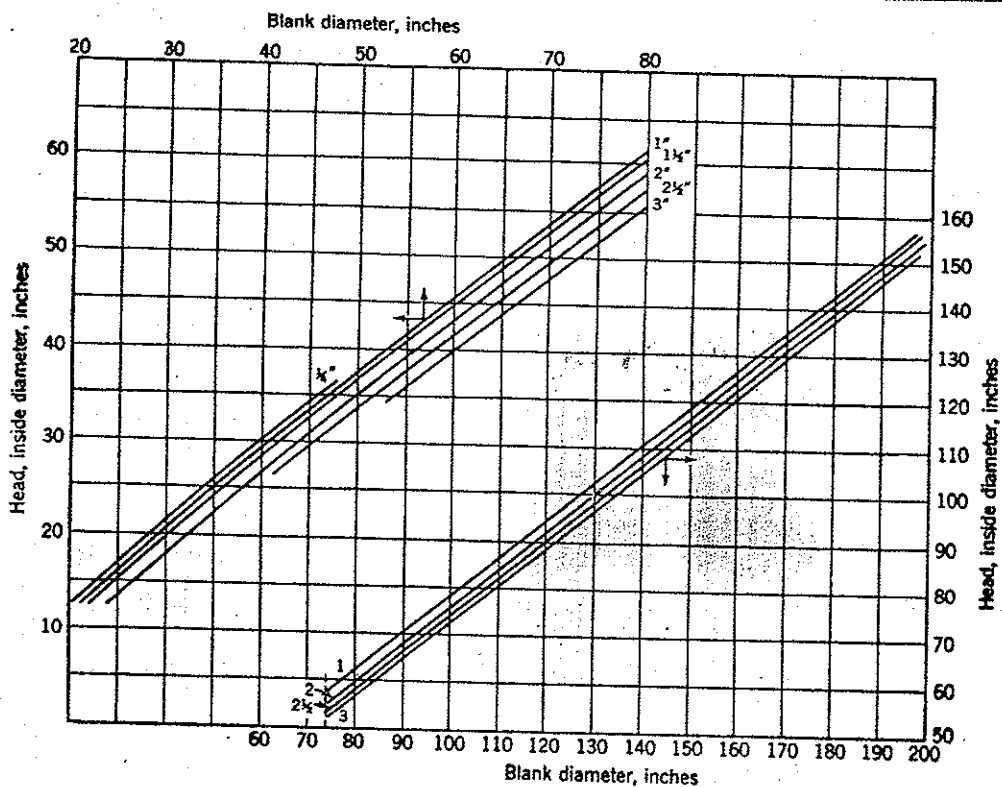


Fig. 5.12. Blank diameter versus head inside diameter for various thicknesses of ASME elliptical heads.



WEIGHT OF FLANGES										
NOM. PIPE SIZE	* 400 lbs.					600 lbs.				
	SLIP ON	* WELD NECK	LONG. WELD NECK	* BLIND	STUDS	SLIP ON	WELD NECK	LONG. WELD NECK	BLIND	STUDS
½	2.0	3.0		2.0	1.0	2.0	3.0		2.0	1.0
¾	3.0	3.5		3.0	2.0	3.0	3.5		3.0	2.0
1	3.5	4.0	11.0	4.0	2.0	3.5	4.0	11.0	4.0	2.0
1¼	4.5	5.5	14.0	6.0	2.0	4.5	5.5	14.0	6.0	2.0
1½	6.5	8.0	17.0	8.0	3.5	6.5	8.0	17.0	8.0	3.5
2	8.0	10.0	21.0	10.0	4.5	8.0	10.0	21.0	10.0	4.5
2½	12.0	14.0	29.0	15.0	7.5	12.0	14.0	29.0	15.0	8.0
3	15.0	18.0	38.0	20.0	7.7	15.0	18.0	38.0	20.0	8.0
3½	21.0	26.0	48.0	29.0	11.6	21.0	26.0	48.0	29.0	11.6
4	24.0	30.0	67.0	33.0	12.0	33.0	37.0	80.0	41.0	12.5
5	31.0	39.0	90.0	44.0	12.5	63.0	68.0	128	68.0	19.5
6	39.0	49.0	115.0	61.0	19.0	80.0	73.0	158	86.0	30.0
8	63.0	78.0	140	100	30.0	97.0	112.0	215	139	40.0
10	91.0	110.0	230	155	52.0	177	189	324	231	72.0
12	129	160	301	226	69.0	215	226	500	295	91.0
14	191	233	336	310	88.0	259	347	417	378	118
16	253	294	416	398	114	366	481	564	527	152
18	310	360	481	502	139	476	555	654	665	193
20	378	445	563	621	180	612	690	840	855	242
22	464	465		685	205	643	710		962	267
24	539	640	799	936	274	876	977	1100	1175	365
26	616	680	970	1111	307	898	960	1250	1490	398
30	859	940	1230	1596	453	1158	1230	1520	1972	574



WEIGHTS OF OPENINGS

NOZZLES

With ANSI Welding Neck Flange and Reinforcing Pad
(Table for Quick Reference)

SIZE	CLASS				
	150	300	600	900	1500
1½	6	11	13	17	18
2	9	12	15	28	30
3	16	25	40	45	70
4	25	40	60	75	105
6	45	70	120	155	225
8	65	110	175	260	380
10	95	145	285	375	620
12	135	220	365	550	920
14	165	285	515	775	
16	215	370	695	965	
18	331	610	935	1379	
20	428	708	1245	1693	
24	589	1131	1815	3041	

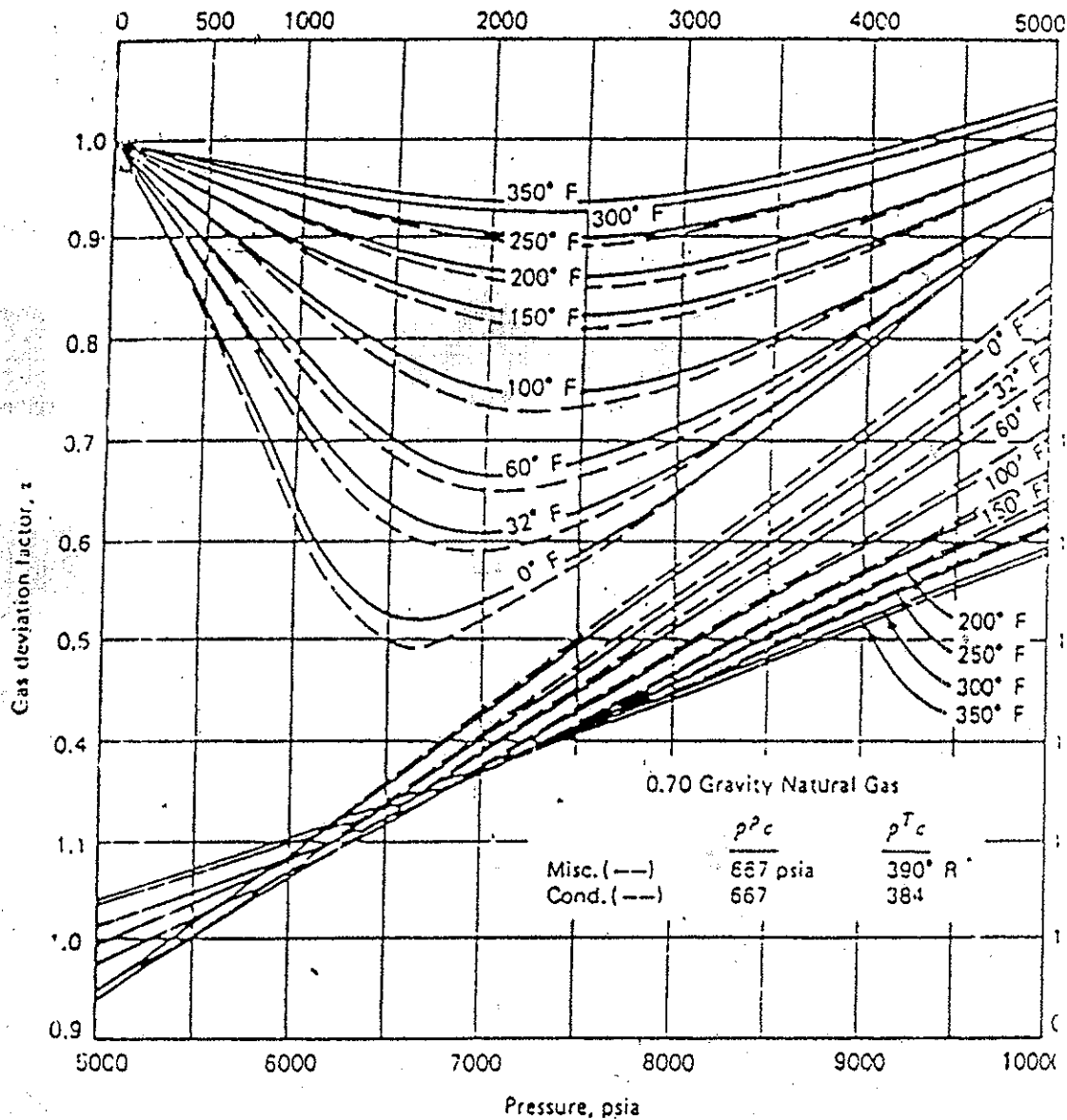
NOZZLES

With ASA Welding Neck Flange, Reinforcing Pad, Blind Flange
Studs and Gasket (Table for Quick Reference)

SIZE	CLASS				
	150	300	600	900	1500
3	25	41	60	77	118
4	42	67	101	129	178
6	71	120	206	268	384
8	110	191	314	457	682
10	165	272	516	665	1127
12	245	404	660	963	1695
14	296	521	893	1269	
16	440	800	1300	1600	3510
18	540	1000	1600	2250	4460
20	700	1200	2100	2800	5700
24	1000	1835	2950	5140	9350

SCREWED COUPLINGS

	NOMINAL PIPE SIZE						
	½	¾	1	1½	2	2½	3
3000 lb	0.25	0.44	0.63	2.19	3.15	4.00	6.75
6000 lb	0.50	1.00	2.13	4.38	7.75	10.75	13.50





WIND DESIGN FOR VESSELS [1]

Notation

- F = design wind force, lb (F_1 , F_2 , F_L , F_u , etc.)
 q_z = wind pressure, psi
 K_z = velocity pressure exposure coefficient from Table 3-1
 I = importance factor (1.0 for vessels)
 V = basic wind speed, mph (See Figure 3-2)
 G_h = gust factor from Table 3-1
 C_r = shape factor, .6-.8 for cylindrical and spherical sections (.6 smooth, .8 rough)
 A_f = projected area, ft²
 G = gust response factor for flexible structures
 P = probability of exceeding design wind speed in n years
 P_a = annual probability of wind speed exceeding a given magnitude, from Table 3-3
 β = structural damping coefficient, % of critical damping (.01 (1%) for vessels)
 T_1 = exposure factor evaluated at $2/3$ of structure's height
 S = structure size factor from Figure 3-1
 D_e = vessel effective diameter, ft, from Table 3-4
 D_o = surface drag coefficient from Table 3-2
 f = natural frequency, $1/T$ cycles per second
 α = power law coefficient from Table 3-2
 T = period of vibration, sec (See Procedure 3-2)
 M_o = overturning moment, ft-lb or in.-lb
 L_e = vessel effective length, ft
 Q = vertical reaction due to wind and dead loads, lb
 W = weight of vessel, lb
 N = number of legs or lugs
 n = number of years of reference period, 1 to 100 yr
 Z = height above grade to $2/3$ of structure's height

Exposure Categories

Exposure A: Large city centers where at least 50% of the buildings exceed 70 ft in height.

- Exposure B: Urban, suburban, or wooded areas with numerous closely spaced obstructions the size of single family dwellings or larger.
- Exposure C: Open terrain with scattered obstructions having heights less than 30 ft. This category includes flat open country and grasslands.
- Exposure D: Flat, unobstructed coastal areas directly exposed to wind flowing over large bodies of water. Includes areas extending inland 1,500 ft or 10 times height of structure.

Table 3-1
Wind Coefficients

Height Above Grade (ft)	K_z Exposure Category				G_h Exposure Category			
	A	B	C	D	A	B	C	D
0-15	.12	.37	.80	1.20	2.36	1.65	1.32	1.1
15-20	.15	.42	.87	1.27	2.20	1.59	1.29	1.1
20-25	.17	.46	.93	1.32	2.09	1.54	1.27	1.1
25-30	.19	.50	.98	1.37	2.01	1.51	1.20	1.1
30-35	.23	.57	1.06	1.45	1.88	1.46	1.23	1.1
40-50	.27	.63	1.13	1.52	1.79	1.42	1.21	1.1
50-60	.30	.68	1.19	1.58	1.73	1.39	1.20	1.0
60-70	.33	.73	1.24	1.63	1.67	1.36	1.19	1.0
70-80	.37	.77	1.29	1.67	1.63	1.34	1.18	1.0
80-90	.40	.82	1.34	1.71	1.59	1.32	1.17	1.0
90-100	.42	.86	1.38	1.75	1.56	1.31	1.16	1.0
100-120	.48	.93	1.45	1.81	1.50	1.28	1.15	1.0
120-140	.53	.99	1.52	1.87	1.45	1.26	1.14	1.0
140-160	.58	1.05	1.58	1.92	1.43	1.24	1.13	1.0
160-180	.63	1.11	1.63	1.97	1.40	1.23	1.12	1.0
180-200	.67	1.16	1.68	2.01	1.37	1.21	1.11	1.0
200-250	.78	1.28	1.79	2.12	1.32	1.19	1.10	1.0

* Adapted from ANSI Code A58.1-1982

Table 3-2
Exposure Category Constants

Category	α	D_o
A	2.0	.02
B	4.5	.01
C	7.0	.00
D	10.0	.00

* Adapted from ANSI Code A58.1-1982



Table 3-15
Seismic Factors, C_s (For $I = 1.0$)

Zone	C_s
0	0
1	.069
2A	.138
2B	.184
3	.275
4	.367

Table 3-16
Effective Diameter, D_e

Diameter (in.)	D_e
< 36	1.5 D
36-54	1.37 D
54-78	1.28 D
78-102	1.2 D
> 102	1.18 D

Table 3-20
Values of k_1

k_1	2θ
.204	120°
.214	126°
.226	132°
.237	138°
.248	144°
.260	150°
.271	156°
.278	162°
.294	168°

Table 3-17
Gust Factor, G_h , and Coefficient, K_z

Height (ft)	G_h	K_z
0-15	1.32	.8
20	1.29	.87
25	1.27	.93
30	1.26	.98
40	1.23	1.06
50	1.21	1.13
60	1.20	1.19

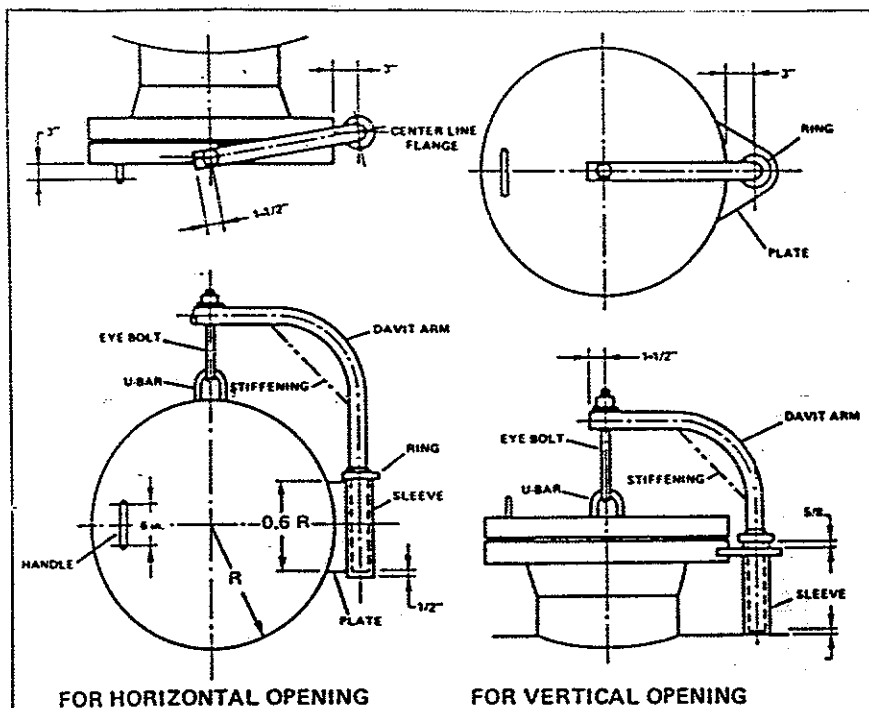


Contact Angle									Contact Angle								
θ	K_1^*	K_2	K_3	K_4	K_5	K_7	K_8	K_9	θ	K_1^*	K_2	K_3	K_4	K_5	K_7	K_8	K_9
120	0.335	1.171	0.880	0.401	0.760	0.003	0.340	0.053	152	0.518	0.781	0.466	0.289	0.669	0.894	0.298	0.03
122	0.345	1.133	0.846	0.393	0.753	0.618	0.338	0.051	154	0.531	0.763	0.448	0.283	0.665	0.913	0.296	0.03
124	0.355	1.108	0.813	0.385	0.746	0.634	0.336	0.050	156	0.544	0.746	0.430	0.278	0.661	0.933	0.294	0.02
126	0.366	1.073	0.781	0.377	0.739	0.651	0.334	0.048	158	0.557	0.729	0.413	0.272	0.657	0.954	0.292	0.02
128	0.376	1.050	0.751	0.369	0.732	0.669	0.332	0.047	160	0.571	0.713	0.396	0.266	0.654	0.976	0.290	0.02
130	0.387	1.022	0.722	0.362	0.726	0.689	0.330	0.045	162	0.585	0.698	0.380	0.261	0.650	0.994	0.286	0.02
132	0.398	0.996	0.694	0.355	0.720	0.705	0.328	0.043	164	0.599	0.683	0.365	0.256	0.647	1.013	0.282	0.02
134	0.409	0.971	0.667	0.347	0.714	0.722	0.326	0.042	166	0.613	0.668	0.350	0.250	0.643	1.033	0.278	0.02
136	0.420	0.946	0.641	0.340	0.708	0.740	0.324	0.040	168	0.627	0.654	0.336	0.245	0.640	1.054	0.274	0.02
138	0.432	0.923	0.616	0.334	0.702	0.759	0.322	0.039	170	0.642	0.640	0.322	0.240	0.637	1.079	0.270	0.02
140	0.443	0.900	0.592	0.327	0.697	0.780	0.320	0.037	172	0.657	0.627	0.309	0.235	0.635	1.097	0.266	0.02
142	0.455	0.879	0.569	0.320	0.692	0.796	0.316	0.036	174	0.672	0.614	0.296	0.230	0.632	1.116	0.262	0.02
144	0.467	0.858	0.547	0.314	0.687	0.813	0.312	0.035	176	0.687	0.601	0.283	0.225	0.629	1.137	0.258	0.01
146	0.480	0.837	0.526	0.308	0.682	0.831	0.308	0.034	178	0.702	0.589	0.271	0.220	0.627	1.158	0.254	0.01
148	0.492	0.818	0.505	0.301	0.678	0.853	0.304	0.033	180	0.718	0.577	0.260	0.216	0.624	1.183	0.250	0.01
150	0.505	0.799	0.485	0.295	0.673	0.876	0.300	0.032									

* $K_1 = 3.14$ if the shell is stiffened by ring or head ($A < R/2$).



DAVIT



- NOTES: 1. All material carbon steel
 2. All welds 3/8" continuous fillet weld
 3. The davit has been tested against excessive deflection

MATERIAL

FLANGE RATING	150#					300#					600#					900#								
SIZE	12	14	16	18	20	24	12	14	16	18	20	24	12	14	16	18	20	24	12	14	16	18	20	24
NO. OF LIST	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	2	2	2	1	1	2	2	2	3
LIST # 1						LIST # 2						LIST # 3												
DAVIT ARM		1-1/2"-XH PIPE					2"-XXH PIPE					2"-XXH PIPE												
SLEEVE		2"-XH PIPE					2-1/2"-STD PIPE					2-1/2"-STD PIPE												
EYE-BOLT		5/8 φ					3/4 φ					1" φ												
U-BAR		5/8 φ					3/4 φ					1" φ												
RING		5/8					3/4					1"												
PLATE		5/8					3/4					1"												
HANDLE		5/8 φ					3/4 φ					1" φ												
STIFFENER		—					—					3/8"												