AA TANKS

DIAPHRAGM EXPANSION TANKS

Sizing for Hydronic Heating/Cooling Systems

Job Name:_____ Date: _____

Job Location: _____ Salesman:_____

Contact Name: _____Model #:_____

Information Required:

1. Total system water content.	_____ gallons
2. Temperature of water when system is filled.	_____ ^{o}F
3. Average maximum operating temperature	_____ ^{o}F
4. Minimum operating pressure	_____ PSIG
5. Maximum operating pressure (10% below relief valve)	_____ PSIG

Model Selection:

6. Enter total system water content. (from line 1. above)	_____ gallons
7. Using the expansion factor table, find and enter the expansion factor.	_____
8. Multiply line 6 by line 7. Enter expanded water volume.	_____ gallons
9. Using acceptance factor table, find and enter the acceptance factor.	_____
10. Divide line 8 by line 9, enter total tank volume required.	_____ gallons

Line 8. _____ gallons Expanded Water (acceptance volume)

Line 10. _____ gallons total tank volume

Select diaphragm expansion tank

NTA Models must satisfy both lines 8 and 10 above.
NLA Models are selected by gallons only from line 10.
NVA Models are selected by gallons only from line 10.

For large systems, multiple tanks can be manifolded together.

CAUTION: This chart is for water only. For expansion factors for glycol solutions contact AAtanks

EXPANSION FACTOR TABLE

For Calculating the Net Expansion of Water

CAUTION: This chart is for water only. For expansion factors for glycol solutions contact AA Tanks.

FINAL TEMP °F.	INITIAL TEMPERATURE °F												
	40	45	50	55	60	65	70	75	80	85	90	95	100
50°	.00006	.00008	–										
55°	.00025	.00027	.00019	–									
60°	.00055	.00057	.00049	.00030	–								
65°	.00093	.00095	.00087	.00068	.00038	–							
70°	.00149	.00151	.00143	.00124	.00094	.00056	–						
75°	.00194	.00196	.00188	.00169	.00139	.00101	.00045	–					
80°	.00260	.00262	.00254	.00235	.00205	.00167	.00111	.00066	–				
85°	.00326	.00328	.00320	.00301	.00271	.00233	.00177	.00132	.00066	–			
90°	.00405	.00407	.00399	.00380	.00350	.00312	.00256	.00211	.00145	.00079	–		
95°	.00485	.00487	.00479	.00460	.00430	.00392	.00336	.00291	.00225	.00159	.00080	–	
100°	.00575	.00577	.00569	.00550	.00520	.00482	.00426	.00381	.00315	.00249	.00170	.00090	–
105°	.00671	.00673	.00665	.00646	.00616	.00578	.00522	.00477	.00411	.00345	.00266	.00186	.00096
110°	.00771	.00773	.00765	.00746	.00716	.00678	.00622	.00577	.00511	.00445	.00366	.00286	.00196
115°	.00879	.00881	.00873	.00854	.00824	.00786	.00730	.00685	.00619	.00553	.00474	.00394	.00304
120°	.01004	.01006	.00998	.00979	.00949	.00911	.00855	.00810	.00744	.00678	.00599	.00519	.00429
125°	.01111	.01113	.01105	.01086	.01056	.01018	.00962	.00917	.00851	.00785	.00706	.00625	.00536
130°	.01236	.01238	.01230	.01211	.01181	.01143	.01087	.01042	.00976	.00910	.00831	.00751	.00661
135°	.01368	.01370	.01362	.01342	.01313	.01275	.01219	.01174	.01108	.01042	.00963	.00883	.00793
140°	.01501	.01503	.01495	.01476	.01446	.01408	.01352	.01307	.01241	.01175	.01096	.01016	.00926
145°	.01643	.01645	.01637	.01618	.01588	.01550	.01494	.01449	.01383	.01317	.01238	.01158	.01068
150°	.01787	.01787	.01779	.01760	.01730	.01692	.01636	.01591	.01525	.01459	.01330	.01300	.01210
155°	.01937	.01939	.01931	.01912	.01882	.01844	.01788	.01743	.01677	.01611	.01532	.01452	.01362
160°	.02092	.02094	.02086	.02067	.02037	.01999	.01943	.01877	.01811	01732	.01652	.01572	.01482
165°	.02252	.02254	.02246	.02227	.02197	.02159	.02103	.02058	.01992	.01926	.01847	.01767	.01677
170°	.02418	.02420	.02412	.02393	.02363	.02325	.02269	.02224	.02158	.02092	.02013	.01933	.01843
175°	.02588	.02590	.02582	.02563	.02533	.02495	.02439	.02394	.02328	.02262	.02183	.02103	.02013
180°	.02763	.02765	.02757	.02738	.02708	.02670	.02614	.02569	.02503	.02437	.02358	.02278	.02188
185°	.02941	.02943	.02935	.02916	.02886	.02848	.02792	.02747	.02681	.02615	.02536	.02456	.02366
190°	.03127	.03129	.03121	.03102	.03072	.03034	.02978	.02933	.02867	.02801	.02722	.02642	.02552
195°	.03314	.03316	.03308	.03289	.03259	.03221	.03165	.03120	.03054	.02988	.02909	.02829	.02739
200°	.03510	.03512	.03504	.03485	.03455	.03417	.03361	.03316	.03250	.03184	.03105	.03025	.02935
205°	.03707	.03709	.03701	.03682	.03652	.03614	.03558	.03513	.03447	.03381	.03302	.03222	.03132
210°	.03911	.03913	.03905	.03885	.03856	.03818	.03762	.03717	.03651	.03585	.03506	.03426	.03336
215°	.04120	.04122	.04114	.04095	.04065	.04027	.03971	.03926	.03860	.03794	.03715	.03635	.03545
220°	.04335	.04337	.04329	.04310	.04280	.04242	.04186	.04141	.04075	.04009	.03930	.03850	.03760
225°	.04549	.04551	.04543	.04524	.04494	.04456	.04400	.04355	.04289	.04223	.04144	.04064	.03974
230°	.04762	.04764	.04756	04737	.04707	.04669	.04613	.04568	.04502	.04436	.04357	.04277	.04187
235°	.04991	.04993	.04985	.04966	.04936	.04898	.04842	.04797	.04731	.04665	.04586	.04506	.04416
240°	.05220	.05222	.05214	.05195	.05165	.05127	.05071	.05026	.04960	.04894	.04815	.04735	.04645
245°	.05449	.05451	.05443	.05424	.05394	.05356	.05300	.05255	.05189	.05123	.05044	.04964	.04874

ACCEPTANCE FACTOR CHART

This table incorporates atmospheric pressure (14.7 psi at sea level)

USE GAGE PRESSURE. Example: A system operating between a minimum operating pressure of 20 psig (fill pressure) and a maximum operating (usually 10% below the relief valve setting) of 40 psig has an acceptance factor of 0.366. To find the acceptance factor, start at the top of the table and locate the minimum operating pressure. Next, locate the minimum operating pressure on the left index. Where the two lines intersect is the acceptance factor.

(Use GaugePressure)

P_0 MAXIMUM OPERATING PRESSURE PSIG	P_f = MINIMUM OPERATING PRESSURE AT TANK (PSIG)											
	5	10	12	15	20	25	30	35	40	45	50	55
10	0.202											
12	0.262	0.075										
15	0.337	0.168	0.101									
20	0.432	0.288	0.231	0.144								
25	0.504	0.378	0.328	0.252	0.126	–						
27	0.527	0.408	0.360	0.288	0.168	–						
30	0.560	0.447	0.403	0.336	0.224	0.112						
35	0.604	0.503	0.463	0.403	0.302	0.202	0.101					
40	0.640	0.548	0.512	0.457	0.366	0.274	0.183	0.091				
45	0.670	0.586	0.553	0.503	0.419	0.335	0.251	0.168	0.084	–		
50	0.696	0.618	0.587	0.541	0.464	0.386	0.309	0.232	0.155	0.078		
55	0.717	0.646	0.617	0.574	0.502	0.430	0.359	0.287	0.215	0.144	0.072	
60	0.736	0.669	0.643	0.602	0.536	0.469	0.402	0.335	0.268	0.201	0.134	0.067
65	0.753	0.690	0.665	0.627	0.565	0.502	0.439	0.376	0.314	0.251	0.188	0.125
70	0.767	0.708	0.685	0.649	0.590	0.531	0.472	0.413	0.354	0.295	0.236	0.177
75	0.780	0.725	0.702	0.669	0.613	0.558	0.502	0.446	0.390	0.333	0.279	0.223
80	0.792	0.739	0.718	0.686	0.634	0.581	0.528	0.475	0.422	0.370	0.317	0.264
85	0.802	0.752	0.732	0.702	0.652	0.602	0.552	0.502	0.451	0.401	0.351	0.301
90	0.812	0.764	0.745	0.716	0.669	0.621	0.573	0.525	0.478	0.430	0.382	0.335
95	0.820	0.775	0.757	0.729	0.684	0.638	0.593	0.547	0.501	0.456	0.410	0.365
100	0.828	0.785	0.767	0.741	0.698	0.654	0.610	0.567	0.523	0.479	0.436	0.392
105	0.835	0.794	0.777	0.752	0.710	0.668	0.626	0.585	0.543	0.501	0.459	0.418
110	0.842	0.802	0.786	0.762	0.723	0.682	0.642	0.601	0.561	0.521	0.481	0.441
115	0.848	0.810	0.794	0.771	0.734	0.694	0.655	0.617	0.578	0.540	0.501	0.463
120	0.854	0.817	0.802	0.780	0.742	0.705	0.668	0.631	0.594	0.557	0.520	0.483
125	0.859	0.823	0.809	0.787	0.752	0.716	0.680	0.644	0.608	0.573	0.537	0.501
130	0.864	0.829	0.815	0.795	0.760	0.726	0.691	0.657	0.622	0.586	0.553	0.519
135	0.868	0.835	0.822	0.802	0.768	0.735	0.701	0.668	0.635	0.601	0.563	0.534
140	0.873	0.840	0.827	0.808	0.776	0.743	0.711	0.679	0.847	0.614	0.582	0.550
145	0.877	0.845	0.833	0.814	0.783	0.751	0.720	0.689	0.858	0.828	0.595	0.564
150	0.880	0.850	0.838	0.820	0.789	0.759	0.729	0.699	0.668	0.638	0.608	0.577
155	0.884	0.854	0.843	0.825	0.795	0.766	0.736	0.707	0.677	0.648	0.618	0.589
160	0.887	0.859	0.847	0.830	0.801	0.773	0.744	0.716	0.687	0.658	0.830	0.601
165	0.890	0.863	0.851	0.835	0.807	0.779	0.751	0.124	0.696	0.668	0.640	0.612
170	0.893	0.866	0.855	0.839	0.812	0.785	0.758	0.731	0.704	0.677	0.649	0.622

NOTE: For pressures not shown above, use 1 - (P_f + atmospheric ÷ P_0 + atmospheric)