



# THERM-X-TROL®

Commercial Thermal Expansion Tanks



For Closed Thermal Water Systems



# THERM-X-TROL®

Amtrol thermal expansion tanks are engineered to control pressure build-up in closed, potable water systems. Available in diaphragm, full acceptance and partial acceptance bladder designs, all Therm-X-Trol expansion tanks are made in the USA at our ISO 9001 : 2008 registered facilities. ASME tanks meet Section VIII, Division 1 Standards.

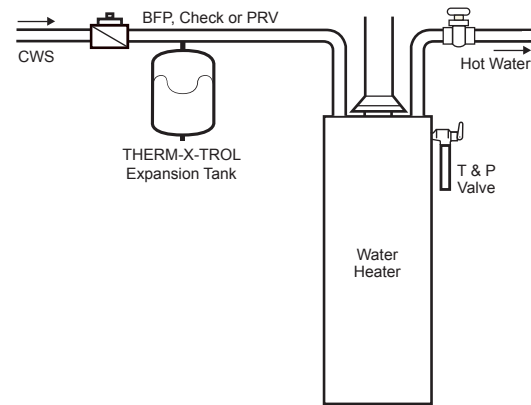


## Features

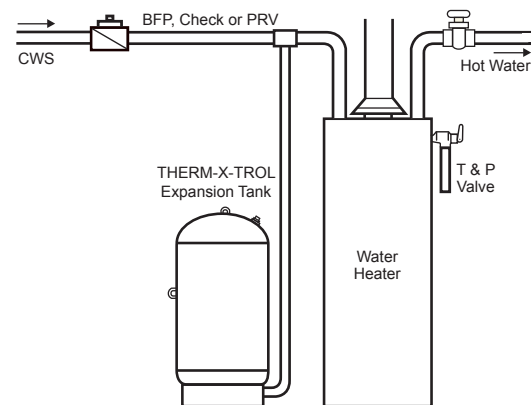
- Accepts expanded water caused by thermal expansion.
- Returns water to the system when hot water is used.
- Protects water heater and fixtures.
- Eliminates wasted energy and water.
- Prevents dangerous pressure build-up.
- Eliminates a potential safety hazard.

## Typical Installations

### In-Line Models

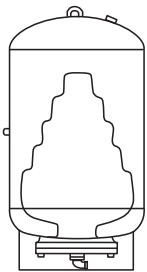


### Stand Models



### Diaphragm Models

- Heavy duty butyl diaphragm; industry's thickest.
- Fixed diaphragm construction for leak-free performance.



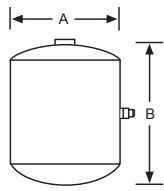
### Bladder Models

- Heavy duty butyl bladder; industry's thickest.
- Replaceable full and partial acceptance designs.

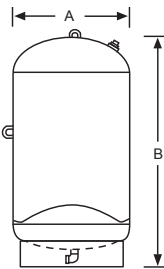
### How to Order: Specify Item & Options

Base Item Number \_\_\_\_\_  
 Pressure \_\_\_\_\_  
 Sight Glass Option \_\_\_\_\_  
 Restraint Option \_\_\_\_\_  
**ST-80VC 150 PSI Rating with Sight Glass & Restraints**

# ASME Thermal Expansion Tanks



ST-5C, ST-12C



ST-20VC through ST-210VC



NSF/ANSI 61

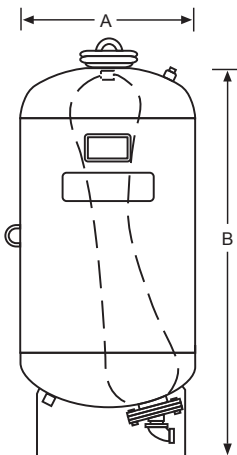
## ASME Diaphragm Series Specifications

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Diameter (Inches)	B Height (Inches)	System Conn. <sup>1</sup> NPTF (Inches)	Shipping Weight (lbs.) Max. Working Pressure			
						150 PSI	175 PSI	250 PSI	300 PSI
ST-5C	2.1	0.9	10	10	3/4	20	23	25	30
ST-12C	6.4	3.2	12	12	3/4	34	37	42	50
ST-20VC	8.0	3.2	12	19	3/4	41	43	50	62
ST-30VC	14.0	9.0	16	19	3/4	59	64	96	108
ST-42VC	18.0	11.0	16	24	3/4	71	75	101	112
ST-60VC	25.0	11.0	16	32	3/4	85	113	125	139
ST-70VC	34.0	11.0	16	45	3/4	99	122	136	151
ST-80VC	53.0	35.0	24	37	1 1/4	224	296	305	340
ST-120VC	68.0	35.0	24	44	1 1/4	266	340	375	400
ST-180VC	77.0	35.0	24	49	1 1/4	285	360	380	420
ST-210VC	90.0	35.0	24	57	1 1/4	319	380	405	440

<sup>1</sup>Stainless Steel System Connection.

Maximum Operating Temperature: 200°F. Factory Pre-charge: 55 PSIG.

## ASME Full Acceptance Bladder Series Specifications



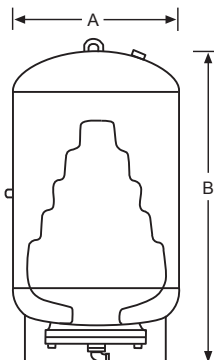
NSF/ANSI 61 Bladder Only

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Diameter (Inches)	B Height (Inches)	System Conn. <sup>1</sup> NPTF (Inches)	Shipping Weight (lbs.) Max. Working Pressure				
						125 PSI	150 PSI	175 PSI	250 PSI	300 PSI
ST-447C	53	53	24	45	2	236	262	290	370	425
ST-448C	80	80	24	59	2	274	340	430	492	540
ST-449C	106	106	24	73	2	320	360	450	510	560
ST-450C	132	132	24	87	2	354	400	460	570	632
ST-451C	159	159	30	73	2	494	587	680	815	895
ST-452C	211	211	30	91	2	593	625	699	1,005	1,107
ST-453C	264	264	36	86	3	667	760	845	1,100	1,205
ST-454C	317	317	36	98	3	762	850	960	1,265	1,400
ST-455C	370	370	36	110	3	842	935	1,065	1,350	1,490
ST-456C	422	422	48	82	3	1,151	1,423	1,650	1,660	1,830
ST-457C	528	528	48	97	3	1,335	1,505	1,875	2,230	2,455

<sup>1</sup>Bronze System Connection.

Maximum Operating Temperature: 240°F. Factory Pre-charge: 55 PSIG.

## ASME Partial Acceptance Bladder Series Specifications

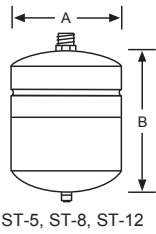


Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Diameter (Inches)	B Height (Inches)	System Conn. <sup>1</sup> NPTF (Inches)	Shipping Weight (lbs.) Max. Working Pressure
						150 PSI
ST-35CL	10	10	10	37	1	76
ST-50CL	13	11	12	37	1	78
ST-85CL	22	11	16	35	1	95
ST-100CL	26	11	16	39	1	102
ST-130CL	34	27	20	35	1	134
ST-165CL	44	27	20	40	1	153
ST-200CL	53	27	24	41	1	205
ST-300CL	80	27	24	56	1	254
ST-400CL	106	53	24	69	1	308
ST-500CL	132	53	24	83	1	352
ST-600CL	158	53	30	67	1	442

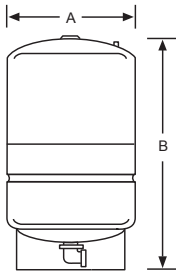
<sup>1</sup>Stainless Steel System Connection.

Maximum Operating Temperature: 240°F. Factory Pre-charge: 55 PSIG.

# Non-ASME Thermal Expansion Tanks



ST-5, ST-8, ST-12



ST-25V through ST-210V



NSF/ANSI 61

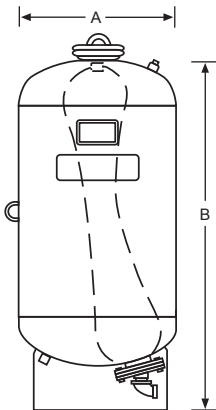
## Non-ASME Diaphragm Series Specifications

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Diameter (Inches)	B Height (Inches)	System Conn. <sup>1</sup> (Inches)	Shipping Weight (lbs.) Max. Working Pressure
						150 PSI
ST-5	2.0	0.9	8	13	3/4	5
ST-8	3.2	1.9	9	15	3/4	7
ST-12	4.4	3.2	11	15	3/4	9
ST-25V	10.3	10.3	15	19	3/4	23
ST-30V	14.0	11.3	15	24	3/4	25
ST-42V	20.0	11.4	15	32	3/4	33
ST-60V	34.0	34.0	22	30	1 1/4	61
ST-80V	44.0	33.9	22	36	1 1/4	69
ST-180V	62.0	34.1	22	47	1 1/4	92
ST-200V	81.0	33.2	22	56	1 1/4	103
ST-210V	86.0	46.4	26	47	1 1/4	123

<sup>1</sup>ST-5 through ST-12: Stainless Steel NPTM System Connection.

ST-25V through ST-210V: Stainless Steel NPTF System Connection.

Maximum Operating Temperature: 200°F. Factory Pre-charge: 40 PSIG.



ST-451 through ST-457



NSF/ANSI 61  
Bladder Only

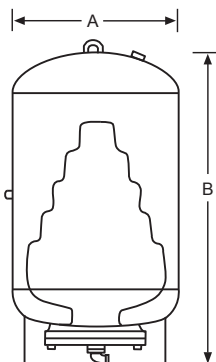
## Non-ASME Full Acceptance Bladder Series Specifications

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Diameter (Inches)	B Height (Inches)	System Conn. <sup>1</sup> (Inches)	Shipping Weight (lbs.) Max. Working Pressure
						150 PSI
ST-451	159	159	30	73	2	550
ST-452	211	211	30	91	2	600
ST-453	264	264	36	86	3	740
ST-454	317	317	36	98	3	825
ST-455	370	370	36	110	3	900
ST-456	422	422	48	82	3	1,390
ST-457	528	528	48	97	3	1,495

<sup>1</sup>ST-451 through ST-457: Bronze NPTF System Connection.

Maximum Operating Temperature: 240°F. Factory Pre-charge: 55 PSIG.

## Non-ASME Parial Acceptance Bladder Series Specifications



ST-35L through ST-600L

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Diameter (Inches)	B Height (Inches)	System Conn. <sup>1</sup> NPTF (Inches)	Shipping Weight (lbs.) Max. Working Pressure
						150 PSI
ST-35L	10	10	10	37	1	76
ST-50L	13	11	12	37	1	78
ST-85L	22	11	16	35	1	95
ST-100L	26	11	16	39	1	102
ST-130L	34	27	20	35	1	134
ST-165L	44	27	20	40	1	153
ST-200L	53	27	24	41	1	205
ST-300L	80	27	24	56	1	254
ST-400L	106	53	24	69	1	308
ST-500L	132	53	24	83	1	352
ST-600L	158	53	30	67	1	442

<sup>1</sup>Stainless Steel System Connection.

Maximum Operating Temperature: 240°F. Factory Pre-charge: 55 PSIG.

# Sizing Guides

## Precise Sizing Guide

### Things You Must Know:

1. Total Water Heater Volume . . . . . \_\_\_\_\_ gallons
2. Maximum System Temperature . . . . . \_\_\_\_\_ °F
3. Minimum System Temperature . . . . . \_\_\_\_\_ °F
4. Maximum Operating Pressure at Expansion Tank . \_\_\_\_\_ PSIG
5. Line Pressure at Expansion Tank . . . . . \_\_\_\_\_ PSIG

### Selection of Expansion Tank:

6. Find and enter "Water Expansion Factor" . . . . . \_\_\_\_\_ (see Table 1)
7. Max. Acceptance Volume = Line (1) x Line (6) . . . . . \_\_\_\_\_ gallons
8. Find and enter "Design Pressure Factor (DPF)" . . . . . \_\_\_\_\_ (see Table 2)
9. Minimum Tank Volume = Line (7) x Line (8) . . . . . \_\_\_\_\_ gallons
10. Select an ASME or non-ASME THERM-X-TROL Expansion Tank that is at least equal to Line (9) for Tank Volume (gallons) and Line (7) for Max. Acceptance Volume (gallons). Multiple tanks may be required.

**Table 1:  
Water Expansion Factor**

Maximum System Temp.	Minimum System Temperature						
	40° F	50° F	60° F	70° F	80° F	90° F	100° F
60° F	.0005	.0049	—	—	—	—	—
70° F	.0015	.0014	.0009	—	—	—	—
80° F	.0026	.0025	.0020	.0011	—	—	—
90° F	.0041	.0040	.0035	.0026	.0015	—	—
100° F	.0058	.0057	.0052	.0043	.0031	.0017	—
110° F	.0077	.0077	.0072	.0062	.0051	.0037	.0019
120° F	.0100	.0099	.0095	.0086	.0074	.0060	.0043
130° F	.0124	.0123	.0118	.0109	.0098	.0083	.0066
140° F	.0150	.0149	.0145	.0135	.0124	.0110	.0093
150° F	.0179	.0178	.0173	.0164	.0153	.0133	.0121
160° F	.0209	.0208	.0204	.0194	.0181	.0165	.0148
170° F	.0242	.0241	.0236	.0227	.0216	.0201	.0184
180° F	.0276	.0275	.0271	.0261	.0250	.0236	.0219
190° F	.0313	.0312	.0307	.0298	.0287	.0272	.0255
200° F	.0351	.0350	.0346	.0336	.0325	.0311	.0294
210° F	.0391	.0390	.0386	.0376	.0365	.0351	.0334
220° F	.0434	.0433	.0428	.0419	.0408	.0393	.0376
230° F	.0476	.0475	.0471	.0461	.0450	.0436	.0419
240° F	.0522	.0521	.0517	.0507	.0496	.0482	.0465

For fluid applications other than water, consult AMTROL technical services.

## Quick-Sizing Charts

**Maximum Temperature Setting 140°F**

Water Heater Size (gals.)	Static Supply Pressure (PSI)		
	40	60	80
40	ST-5	ST-5	ST-5
50	ST-5	ST-5	ST-5
60	ST-5	ST-5	ST-8
80	ST-8	ST-8	ST-12
120	ST-12	ST-12	ST-25V

**Maximum Temperature Setting 150°F**

Water Heater Size (gals.)	Static Supply Pressure (PSI)		
	40	60	80
40	ST-5	ST-5	ST-5
50	ST-5	ST-5	ST-8
60	ST-8	ST-8	ST-8
80	ST-8	ST-8	ST-12
120	ST-12	ST-12	ST-25V

**Maximum Temperature Setting 180°F**

Water Heater Size (gals.)	Static Supply Pressure (PSI)		
	40	60	80
40	ST-8	ST-8	ST-8
50	ST-8	ST-8	ST-12
60	ST-8	ST-12	ST-25V
80	ST-12	ST-25V	ST-25V
120	ST-25V	ST-25V	ST-25V

- Sizing charts are based on 40°F incoming water temperature and a 150 PSI T&P safety relief valve.

- For multiple heaters, use the total volume of the water heaters plus any storage tanks.

- THERM-X-TROL precharge must be set to the static supply pressure prior to installation.

**Table 2:  
Design Pressure Factor (DPF)**

Maximum Allowable Pressure (PSI)	Line Pressure (PSI)	Design Pressure Factor (DPF)
100	40	1.9
	50	2.3
	60	2.9
	70	3.8
125	80	5.7
	40	1.6
	50	1.9
	60	2.1
150	70	2.5
	80	3.1
	40	1.5
	50	1.6
150	60	1.8
	70	2.1
	80	2.4

For conditions not shown in table, use equation:

$$DPF = \frac{\text{Max. Allow. Pressure} + 14.7}{\text{Max. Allow. Pressure} - \text{Line Pressure}}$$



# Made in the USA

From modest beginnings in founder Chet Kirk's garage to our current, state-of-the-art facilities, Amtrol is still proudly manufacturing products in the USA. Our talented, dedicated associates are committed to providing you with the highest quality, most reliable and best performing products on the market.



*Associates at our West Warwick, Rhode Island manufacturing facility.*

**Additional support materials include:**

- Commercial and Industrial Products Catalog (MC 4401)
- Data Submittal Sheets (MC 4400)
- Engineering Handbook (MC 4402P)
- Product Sizing programs on [www.amtrol.com](http://www.amtrol.com)
- Revit Files (MC 10205)
- AutoCAD Files (MC 10029)



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