AMTROL INC.

EXTROL®

Expansion Tanks

As Seen On

Ask This Old House

For Closed Hydronic Heating, Radiant, Solar & Chilled Water Systems

AMTROL® Quality Expansion Tanks

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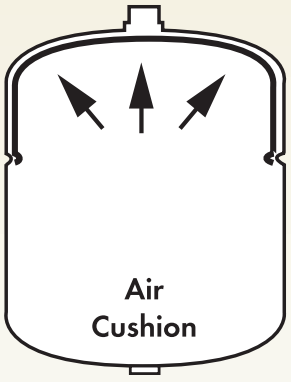
The First in the Industry

AMTROL designed and patented the first EXTROL® expansion tank in 1954, redefining hydronic heating systems. For five decades our unique, pre-pressurized, diaphragm-design EXTROL has been the world's leading expansion tank. EXTROL was designed to control system pressure and help reduce energy consumption of heating and circulating operations.

The AMTROL Advantage

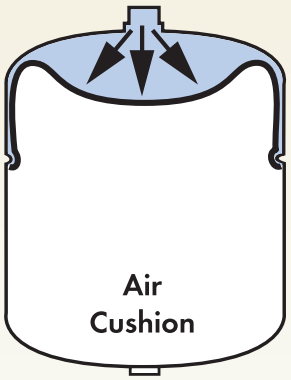
- AMTROL offers a complete line of quality engineered products for heating and water systems throughout the world.
- ISO 9001:2008 Registration reflects AMTROL's worldwide vision and commitment to excellence and customer focus.
- Full technical support is available at 401-535-1216.

How AMTROL Expansion Tanks Work



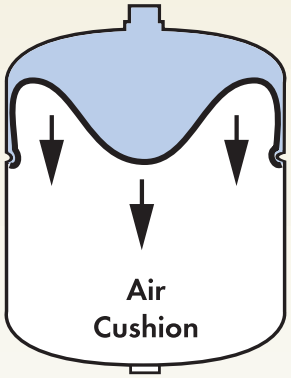
A

When the system is first filled with cold water, the EXTROL's pre-charge pressure, which is equal to the fill pressure, keeps the diaphragm flush against the tank.



B

As the system water temperature increases, the expanded water is absorbed by the EXTROL tank.

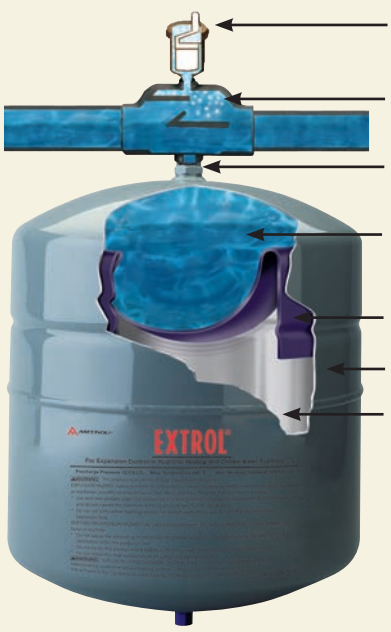


C

As the system water temperature reaches its maximum, the EXTROL diaphragm flexes against the air cushion to allow for the increased water expansion.

AMTROL® EXTROL System Advantages

- Provides permanent separation of system water from air cushion
- Controls system pressure
- Butyl/EPDM diaphragm for superior air retention — 9 times better than natural rubber
- Easy to install



AMTROL Automatic Air Vent eliminates system air

AMTROL Air Purger separates air from water

Provides permanent point of pressure reference at the system connection

Water-tight reservoir for expanded water

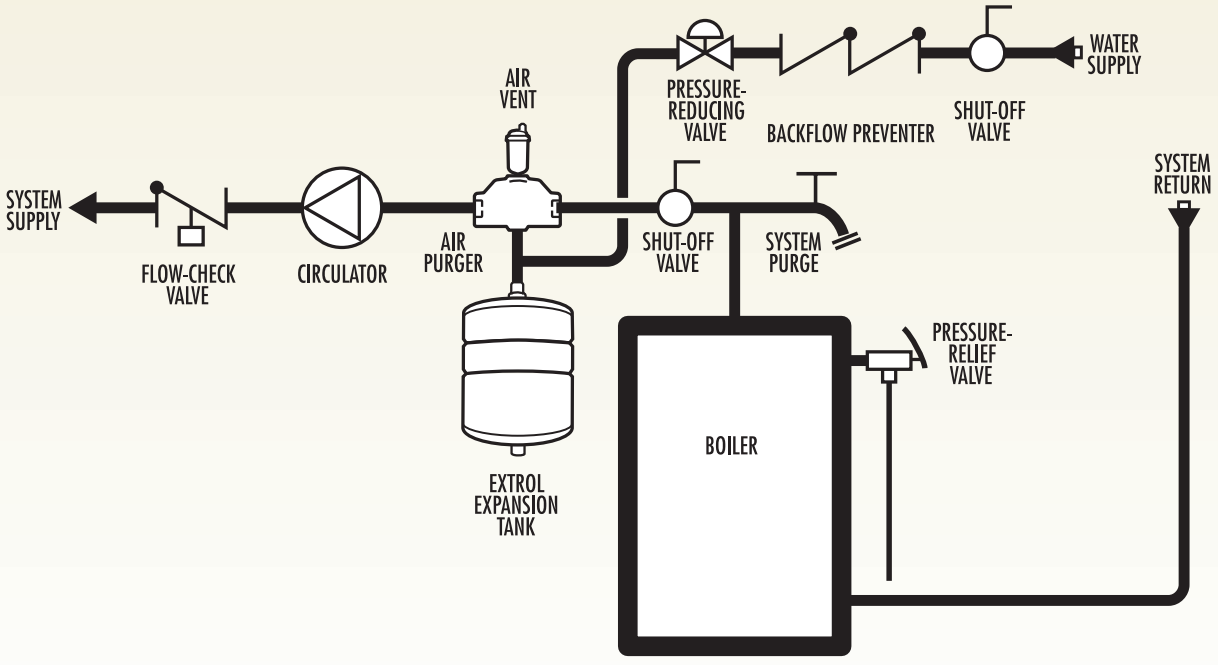
Butyl/EPDM diaphragm

Deep-drawn steel tank

Air-tight air cushion — factory pre-charged and 100% tested

Typical Installation of Residential Models

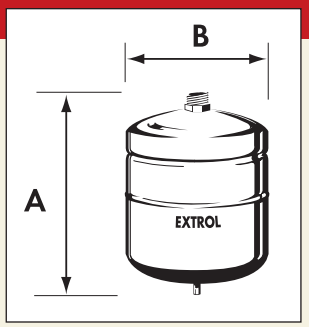
(The EXTROL is for use only in closed hydronic heating systems and chilled non-potable water systems.)



Residential Models and Packages

EXTROL®

- Factory pre-charged to 12 psig
- Maximum working pressure: 100 psig
- Maximum operating temperature: 240°F



EXTROL® Specifications

Model Number	Tank Vol. (Gallons)	Max. Accept. Vol. (Gallons)	A Height (Inches)	B Dia. (Inches)	System Conn. NPTM (Inches)	Shipping Wt. (lbs.)
15	2.0	0.9	12 5/8	8	½	5
30	4.4	2.5	15 ½	11	½	9
60	7.6	2.5	23	11	½	14
90	14.0	11.3	21	15 3/8	½	23

EXTROL® Combination Packages

Model Number	EXTROL Model	Purger Model	Vent Model	Shipping Wt. (lbs.)
1500/1 or 1 ¼	15	443 or 444	700-C	9
3000/1 or 1 ¼	30	443 or 444	700-C	14
6000/1 ¼	60	444	700-C	19
6000/1 ½	60	445	700-C	19

Sizing the EXTROL

Sizing Based on BTU's

BOILER		TYPE OF RADIATION		
Net Output in 1000'S of BTU/Hr.	Finned Tube Baseboard or Radiant Panel	Convectors or Unit Heaters	Radiators Cast Iron	Baseboard Cast Iron
MBH	Use Model	Use Model	Use Model	Use Model
25	15	15	15	15
50	15	15	30	30
75	30	30	30	60
100	30	30	60	60
125	30	60	60	90
150	30	60	90	90
175	60	60	SX-30V	SX-30V
200	60	60	SX-30V	SX-30V
250	60	90	SX-30V	SX-40V
300	90	SX-30V	SX-30V	SX-40V
350	SX-30V	SX-30V	SX-40V	SX-60V
400	SX-30V	SX 40V	SX-40V	SX-60V

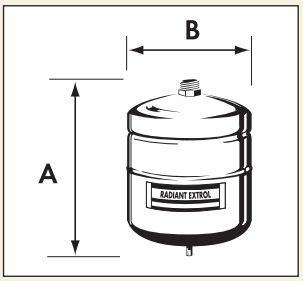
Sizing based on: • Fill Pressure 12 psig • Relief Pressure 30 psig • Average System Temp. 200°F • System filled with water • Consult factory for compatibility and sizing for other fluids.

Max. System Temp. °F	System Water Content in Gallons			
	Model 15	Model 30	Model 60	Model 90
100	125	275	417	876
110	93	205	311	653
120	72	158	239	502
130	58	128	194	407
140	48	105	160	336
40	89	134	282	90
160	34	76	115	241
170	30	65	99	208
180	26	57	87	182
190	23	51	77	161
200	20	45	68	143
210	18	40	61	129
220	17	37	55	116
230	15	33	50	106
240	14	30	46	96

Sizing by system temp. based on: • Max. Operating Temperature 240°F • Fill Pressure 12 psig • Relief Pressure 30 psig • Water Fill Temperature 40°F

For Radiant Systems, Use RADIANT EXTROL®

- Specifically designed for high-efficiency radiant systems
- Plastic liner compatible with barrier and non-barrier systems
- Suitable for use in glycol applications
- Non-ferrous system connection for corrosion resistance
- Maximum working pressure: 100 psig
- Maximum operating temperature: 200°F
- Factory Pre-charge 12 psi



RADIANT EXTROL® Tanks for Radiant Systems

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Height (Inches)	B Dia. (Inches)	System Conn. (Inches)	Shipping Wt. (lbs.)
RX-15	2.0	0.9	12 5/8	8	¾ NPTM	5
RX-30	4.4	3.2	15 ½	11	¾ NPTM	9
RX-60	10.3	10.3	19 ¼	15 3/8	¾ NPTF	23

Radiant Extrol® Quick Sizing Chart

Feet of Tubing	Nominal Pex Tubing Size				
	3/8"	1/2"	5/8"	3/4"	1"
1000	RX-15	RX-15	RX-15	RX-15	RX-15
5000	RX-15	RX-15	RX-15	RX-30	RX-30
7500	RX-15	RX-15	RX-30	RX-30	RX-60
10000	RX-15	RX-30	RX-30	RX-60	RX-60
14000	RX-15	RX-30	RX-60	RX-60	
18000	RX-30	RX-60	RX-60	RX-60	
22000	RX-30	RX-60	RX-60	See Precise Sizing on back page.	
30000	RX-30	RX-60			

Based on 120°F operating temp. with 12psi fill and 30psi relief valve.
For glycol applications, consult AMTROL Technical Support.

For Solar Systems, Use Solar EXTROL®

The Solar EXTROL uses a specifically blended diaphragm that can handle temperature spikes commonly seen in solar systems.

- Specifically designed for high-efficiency solar systems
- Suitable for use in glycol applications
- Maximum working pressure: 100 psig
- Maximum intermittent operating temperature: 250°F
- Maximum continuous operating temperature: 225°F

Solar EXTROL Tanks for Solar Systems

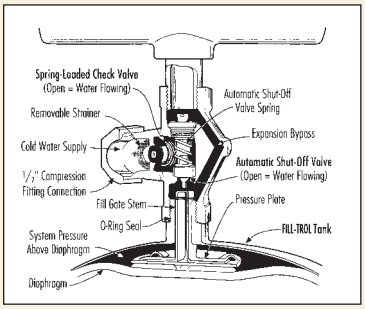
Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Height (Inches)	B Dia. (Inches)	System Conn. (Inches)	Shipping Wt. (lbs.)
SE-15	2.0	0.9	12 5/8	8	½	5
SE-30	4.4	2.5	15 ½	11	½	9
SE-60	7.6	2.5	23	11	½	14

The FILL-TROL® System

Expansion Control with Automatic Fill Feature

The AMTROL FILL-TROL system consists of a specially adapted EXTROL pre-pressurized, diaphragm-type expansion tank, and the FILL-TROL, a specially designed, automatic, pressure-reducing fill valve.

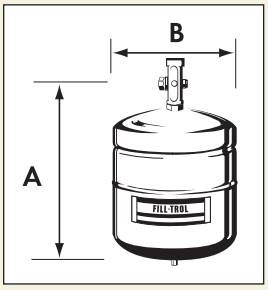
- Provides accurate system make up
- Eliminates need for a separate, automatic fill valve
- Fully adjustable up to a maximum working pressure of 100 psig
- Factory pre-charged to 12 psig; tank pressure controls system fill



FILL-TROL Specifications

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Height (Inches)	B Dia. (Inches)	System Conn. NPTF (Inches)	Shipping Wt. (lbs.)
109	2.0	0.9	14 3/4	8		6
110	4.4	2.5	17 3/8	11	½	10
111	7.6	2.5	24 5/8	11	½	15
112	14.0	11.3	23	15 3/8	½	24

Note: A standard EXTROL tank is not interchangeable with a FILL-TROL tank. To use either sizing chart on page 4 for selection, 109 FILL-TROL is equivalent to #15 EXTROL, 110 FILL-TROL is equivalent to #30 EXTROL, 111 FILL-TROL is equivalent to #60 EXTROL, and 112 FILL-TROL is equivalent to #90 EXTROL.



FILL-TROL Combination Packages

Model Number	Fill-Trol Model	Air Purger	Air Vent Model No.	Shipping Wt. (lbs.)
109-P/1 or 1¼	109	443 or 444	700-C	10
110-P/1 or 1¼	110	443 or 444	700-C	14
111-P/1¼	111	444	700-C	18

How the FILL-TROL System Works

Water enters the FILL-TROL valve, pushing open the check valve, and flows into the heating system. The automatic shut-off valve is kept open by the diaphragm pressing against the pressure plate, raising the stem of the fill gate, which compresses the automatic shut-off valve spring. When the heating system reaches fill pressure (typically 12 psig), the tank's diaphragm depresses and the automatic shut-off valve is closed.

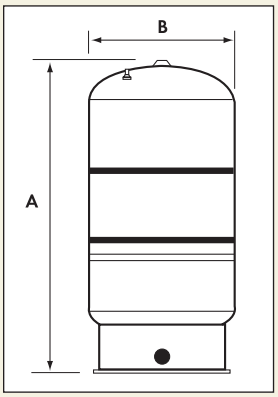
Whenever system pressure falls below the tank precharge, the automatic shut-off valve is pressed open by the diaphragm. Make-up water flows into the system to restore pressure.

Commercial Non-ASME Models

The SX Series EXTROL®

- Floor-standing models
- Factory pre-charged to 12 psig
- Maximum working pressure: 100 psig
- Maximum operating temperature: 240°F

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Height (Inches)	B Dia. (Inches)	System Conn. NPTF (Inches)	Shipping Wt. (lbs.)
SX-30V	14	11.3	24 ¾	15 ⅜	1	25
SX-40V	20	11.3	32 ½	15 ⅜	1	33
SX-60V	32	11.3	47 ½	15 ⅜	1	43
SX-90V	44	34.0	36	22	1 ¼	69
SX-110V	62	34.0	46 ¾	22	1 ¼	92
SX-130V	81	34.0	56 ⅜	22	1 ¼	103
SX-160V	86	46.0	47 ¼	26	1 ¼	123

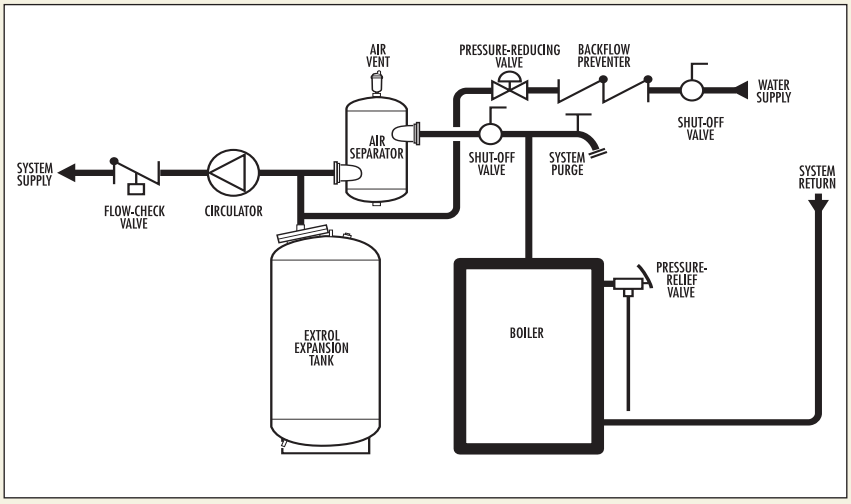


SX Series Sizing & Selection Data

Boiler	Type of Radiation and Piping System			
Net Output in 1000's of BTU	Finned Tube Baseboard or Radiant Panels with Series Loop System	Convectors or Unit Heaters with One Pipe System	Radiators or One Pipe System	Radiators Cast Iron with series Loop System
200	SX- 30V	SX-30V	SX-30V	SX-30V
250	SX- 30V	SX-30V	SX-30V	SX-40V
300	SX- 30V	SX-30V	SX-40V	SX-40V
350	SX-30V	SX-30V	SX-40V	SX-60V
400	SX-30V	SX-40V	SX-60V	SX-60V
450	SX-40V	SX-40V	SX-90V	SX-90V
500	SX-40V	SX-40V	SX-60V	SX-90V
550	SX-40V	SX-60V	SX-60V	SX-90V
600	SX-40V	SX-60V	SX-90V	SX-90V
650	SX-60V	SX-60V	SX-90V	SX-90V
700	SX-60V	SX-60V	SX-90V	SX-90V
750	SX-60V	SX-60V	SX-90V	SX-110V
800	SX-60V	SX-90V	SX-90V	SX-110V
850	SX-60V	SX-90V	SX-90V	SX-110V
900	SX-60V	SX-90V	SX-110V	SX-110V
950	SX-90V	SX-90V	SX-110V	SX-110V
1000	SX-90V	SX-90V	SX-110V	SX-110V
1100	SX-90V	SX-90V	SX-110V	SX-130V
1200	SX-90V	SX-90V	SX-110V	SX-130V
1300	SX-90V	SX-110V	SX-130V	SX-160V
1400	SX-110V	SX-130V	SX-160V	SX-160V
1500	SX-110V	SX-130V	SX-160V	(2)SX-110V

These recommendations are calculated on average boiler water volumes and the average water volumes of currently popular types of radiation and piping systems. The industry operating standards of 12 psig fill pressure and 30 psig relief pressure are used. For boiler sizes or operating conditions other than above, refer to **page 8**, *or consult our technical department for recommendations.*

Typical Installation of Commercial Models



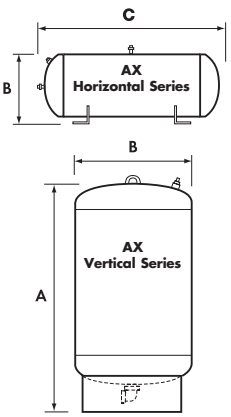
Commercial ASME Models

AX Series EXTROL®
Horizontal & Vertical Models

- Proven diaphragm design since 1954
- Designed and constructed per ASME Section VIII, Division 1 standards
- Horizontal models are available with optional saddles
- Factory pre-charged to 12 psig
- Maximum working pressure is 125 psig
- Maximum operating temperature is 240°F
- Higher pressures available upon request

AX Series Specifications

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A - Vert. Height (Inches)	C - Horiz. Length (Inches)	B Diameter (Inches)	System Conn.[1] (Inches)	Horiz. Ship. Wt. w/o saddles (lbs.)	Ship. Wt. with saddles (lbs.)	Vertical Ship. Wt. (lbs.)
AX-15(V)*	8.0	2.4	19 ½	19 ¼	12	½	37	41	43
AX-20(V)	10.9	2.4	26 ½	26 ¼	12	½	46	50	45
AX-40(V)	21.7	11.3	29 ½	29	16 ¼	½	82	96	90
AX-60(V)	33.6	11.3	45 ⅛	43	16 ¼	½	103	116	110
AX-80(V)	44.5	22.6	27 ¾	27 ¼	24	1	104	127	146
AX-100(V)	55.7	22.6	32 ⅜	31 ⅞	24	1	114	137	167
AX-120(V)	68.0	34.0	43 ⅞	39 ⅞	24	1	210	235	224
AX-144(V)	77.0	34.0	48 ¾	44 ¾	24	1	240	246	244
AX-180(V)	90.0	34.0	56 ⅛	52 ⅛	24	1	242	248	266
AX-200(V)	110.0	34.0	62 ⅝	62 ⅝	24	1	275	306	296
AX-240(V)	132.0	46.0	53 ½	49 ⅝	30	1	398	428	427
AX-260(V)	158.0	56.0	60 ½	58	30	1¼	449	480	476
AX-280(V)	211.0	84.0	78 ¼	75 ¾	30	1¼	630	660	645

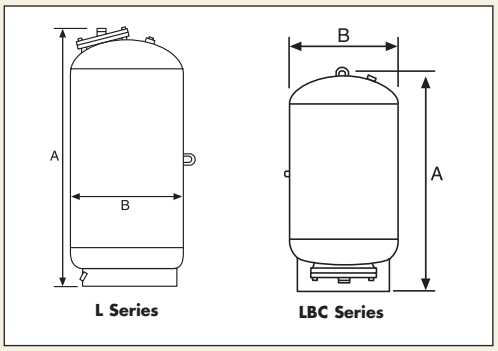


[1]*System Connection for models AX-15 through AX-100 (vertical and horizontal) and models AX-120V through AX-240V are NPTF, models AX-260 through AX-280 (vertical and Horizontal) and AX-120 through AX-240 are NPTM.*

**To specify vertical models AX -15V – AX-280V, include V after the model number; other options available on all models: • Bulls Eye Sight Glass • Seismic Anchor Brackets*

L Series EXTROL® & LBC Series EXTROL®

- Replaceable bladder design
- Designed and constructed per ASME Section VIII, Division 1 standards
- Free-standing on integral floor stands
- Easily installed
- Factory pre-charged to 12 psig
- Maximum working pressure is 125 psig
- Available with optional 150, 175, 250, or 300 psig for high-pressure applications
- Maximum operating temperature is 240°F
- LBC Series are partial acceptance tanks available at 125 or 150 psig



L-Series Specifications

Model Number	Tank Volume (Gallons)	A Height (Inches)	B Diamet (Inches)	C Standard Dia.(In.)	System Conn. NPTF (Inches)	Shipping Weight (lbs.)
200-L	53	36⅞	24	19	1	192
300-L	80	50⅞	24	19	1	268
400-L	106	64¾	24	19	1	309
500-L	132	79½	24	19	1	328
600-L	158	64	30	24	1½	510
800-L	211	81¾	30	24	1½	565
1000-L	264	73	36	30	1½	691
1200-L	317	85⅜	36	30	1½	779
1400-L	370	97¾	36	30	1½	905
1600-L	422	69⅛	48	42	1½	1,183
2000-L	528	84	48	42	1½	1,264
2500-L	660	100⅜	48	42	2	1,445
3000-L	792	118⅛	48	42	2	1,630
3500-L	925	111	54	42	2	2,110
4000-L	1057	124½	54	42	2	2,230

LBC-Series Specifications

Model Number	Tank Volume (Gallons)	A Height (Inches)	B Diamet (Inches)	C Standard Dia.(In.)	System Conn. NPTF (Inches)	Shipping Weight (lbs.)
35-LBC	10	10	38 13/16	10	1	65
50-LBC	13	11	38 13/16	12	1	72
85-LBC	22	11	37⅞	16	1	88
100-LBC	26	11	42⅛	16	1	94
130-LBC	34	27	37⅞	20	1	130
165-LBC	44	27	42⅞	20	1	140
200-LBC	53	27	40⅞	24	1	192
300-LBC	80	27	56	24	1	230
400-LBC	106	53	68⅝	24	1	274
500-LBC	132	53	82½	24	1	308
600-LBC	158	53	67	30	1	442

Precise Sizing

Precise Sizing of EXTROL® & RADIANT EXTROL®

Things you must know:

1. Total System Volume. . . . . (1)_____ gallons
2. Minimum System Temperature . . . . . (2)_____°F
3. Maximum System Temperature. . . . . (3)_____ °F
4. Minimum Operating Pressure at Expansion Tank . . . . . (4)_____ psig
5. Maximum Operating Pressure at Expansion Tank. . . . . (5)_____ psig

Selection of Expansion Tank:

6. Find and enter "Net Expansion Factor" . . . . . (6)_____ (see table 1)
7. Amount of Expanded Water = line (1) x line (6) . . . . . (7)_____ gallon
8. Find and enter "Acceptance Factor". . . . . (8)_____ (see table 2)
9. Minimum Total Tank Volume = line (7) ÷ line (8) . . . . . (9)_____ gallons
10. Using Specifications on pages 6 and 7, select an Expansion Tank that is at least equal to line (9) for "Total Volume" and line (7) for Max. Expanded Water Acceptance Gallons. Multiple tanks may be required.

Table 1. Net Expansion of Water

Max. Sys. Temp.	Minimum System Temperature						
Temp. °F	40°F	50°F	60°F	70°F	80°F	90°F	100°F
60°F	.0005	.0049	–	–	–	–	–
70°F	.00149	.00143	.00094	–	–	–	–
80°F	.00260	.00254	.00204	.00111	–	–	–
90°F	.00405	.00399	.00350	.00256	.00145	–	–
100°F	.00575	.00569	.00520	.00426	.00315	.00170	–
110°F	.00771	.00765	.00716	.00622	.00511	.00366	.00196
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

Note: For ethylene glycol and for propylene glycol contact AMTROL® technical services.

Table 2. Acceptance Factors*

Max. Oper Pressure at Tank (psig)	Minimum Operating Pressure at Tank (psig)										
	5	10	12	15	20	30	40	50	60	70	80
27	0.527	0.408	0.360	0.288	0.168	–	–	–	–	–	–
30	0.560	0.447	0.403	0.336	0.224	–	–	–	–	–	–
35	0.604	0.503	0.463	0.403	0.302	0.101	–	–	–	–	–
40	0.640	0.548	0.512	0.457	0.366	0.183	–	–	–	–	–
45	0.670	0.586	0.553	0.503	0.419	0.251	0.084	–	–	–	–
50	0.696	0.618	0.587	0.541	0.464	0.309	0.155	–	–	–	–
55	0.717	0.646	0.617	0.574	0.502	0.359	0.215	0.072	–	–	–
60	0.736	0.669	0.643	0.602	0.536	0.402	0.268	0.134	–	–	–
65	0.753	0.690	0.665	0.627	0.565	0.439	0.314	0.188	0.062	–	–
70	0.767	0.708	0.685	0.649	0.590	0.472	0.354	0.236	0.118	–	–
75	0.780	0.725	0.702	0.669	0.613	0.502	0.390	0.279	0.167	0.056	–
80	0.792	0.739	0.718	0.686	0.634	0.528	0.422	0.317	0.211	0.106	–
90	0.812	0.764	0.745	0.716	0.669	0.573	0.478	0.382	0.287	0.191	0.096
100	0.828	0.785	0.767	0.741	0.698	0.610	0.523	0.436	0.347	0.261	0.174
110	0.842	0.802	0.786	0.762	0.723	0.642	0.561	0.481	0.401	0.321	0.24

** Acceptance factors based on expansion tank being charged to minimum operating pressure while empty of liquid.*

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