Thermal Expansion Products

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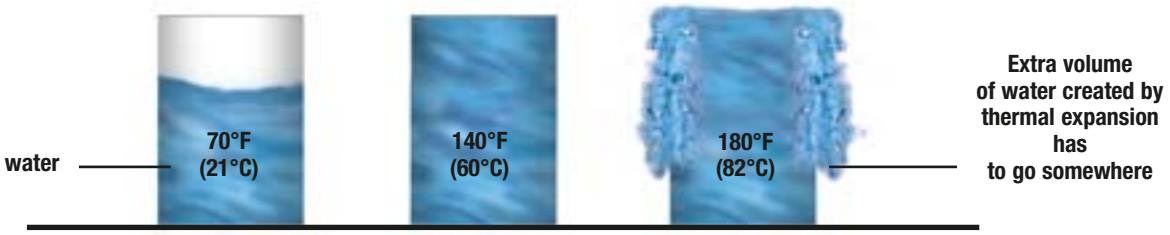
General Information

What is Thermal Expansion?

When water is heated, it expands. For example, water heated from 90ºF (32ºC) to a thermostat setting of 140ºF (60ºC) in a 40 gallon hot water heater will expand by almost one-half gallon. This is because when water is heated, its density decreases and its volume expands (see fig. 1). Since water is not compressible, the extra volume created by expansion must go someplace. During no-flow periods in a system, pressure reducing valves, backflow preventers, and other one-way valves are closed, thus eliminating a path for expanded water to flow back to the system supply. Hence, system pressure increases.

figure 1

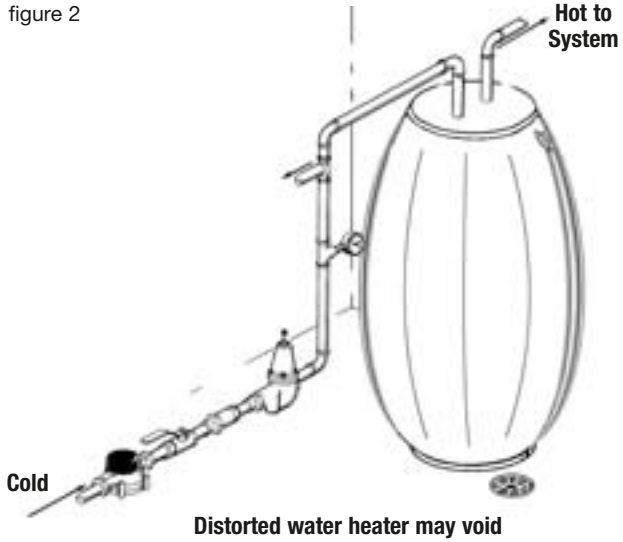


Temperature vs Density

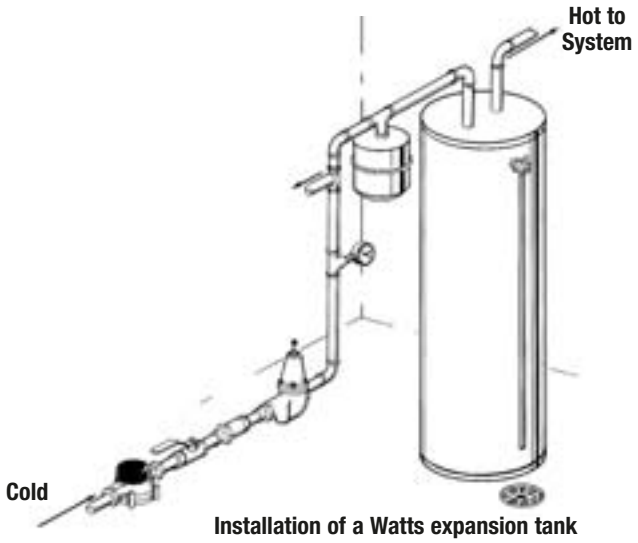
Thermal expansion of water in a closed plumbing system can create a number of annoying and potentially dangerous problems. These include: the build up of unusually high pressure in a system (even when a pressure reducing valve is installed); pressure surges; and the chronic or continuous dripping of a temperature and pressure (T&P) relief valve. In addition, dripping faucets and leaking toilet tank ball cock fill valves are also symptomatic of thermal expansion.

More serious problems can also occur due to thermal expansion. When dangerous pressures are built up in a water heater, internal parts may fail such as the internal flues, fittings or water connections. If a flue way collapses, it can lead to the potential release of toxic gases, such as carbon monoxide into living spaces. Thermal expansion can also lead to a ruptured or distorted hot water heating tank and may void the manufacturer's warranty (see fig.2).

figure 2



Distorted water heater may void manufacturer's warranty.



Installation of a Watts expansion tank will protect the water heater.

Plumbing codes require you to address this safety problem.

No matter what your thermal expansion problem may be, whether for new construction or for retrofitting or remodeling an existing system, Watts offers cost effective solutions for you as outlined in the following pages of this guide. Should you require more detailed information on these products, please feel free to call your local Watts representative, listed on the back of this guide.

Plumbing Code Requirements

Thermal Expansion Control

Plumbing codes require that thermal expansion control be addressed in plumbing systems. **A temperature and pressure relief valve is not considered a thermal expansion device.** This is because when water is allowed to continuously drip from the T&P relief valve, minerals from the water can build up on the valve, eventually blocking it. This blockage can render the T&P valve useless and potentially lead to hot water heater explosions. The International Plumbing Code (IPC), Uniform Plumbing Code (UPC) and Standard Plumbing Code all require thermal expansion control to be addressed.

Expansion Tank Construction

Section VIII of the ASME Boiler and Pressure Vessel Code states certain requirements that must be met by an expansion tank for it to meet ASME construction specifications. The Watts Series ETA, ET-RA and DETA tanks all meet these ASME requirements.

Potable vs Nonpotable Systems

Potable refers to water in an open domestic hot water heating system. This is water that could potentially be consumed by people and is not recirculated within the system. Nonpotable refers to water in a closed hydronic heating, radiant floor heating, or a chilled water system where the water is recirculated and does not leave the system.

Each of these hot water heating systems have different thermal expansion requirements explained in more depth in the following pages of this guide.

Water Containment vs Water Relief Solutions

Water Containment solutions allow for thermal expansion while containing thermally expanded water in the plumbing system. The Watts full line of thermal expansion tanks are considered water containment devices. These products require no installation of discharge lines or drains.

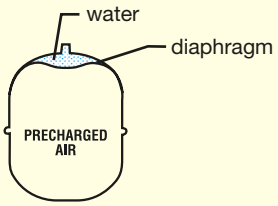
Water Relief solutions discharge thermally expanded water at a pressure setting that is below the setting of the water heater's temperature and pressure relief valve. Watts offers a variety of water relief solutions that can be installed on the system piping, in a water closet or on an outside faucet. These products must be piped to a suitable drain or discharge location.

Expansion Tanks

How a Diaphragm Expansion Tank Works

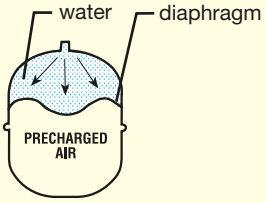
When water is heated in a closed system, it expands. Water is not compressible, therefore, the additional water volume created has to go someplace. When an expansion tank is installed, the excess water enters the prepressurized tank (figure 3). As the temperature and pressure reaches its maximum, the diaphragm flexes against an air cushion (air is compressible) to allow for increased water expansion (figure 4). When the system is opened again or the water cools, the water leaves the tank and returns to the system.

figure 3 - **How Expansion Tanks work**



As the water temperature increases, the expanded water is received by the tank.

figure 4



As the temperature and pressure reaches its maximum, the diaphragm flexes against the air cushion (air is compressible) to allow for increased water expansion.

Note: Expansion tanks are always located on the cold water piping to the water heater or heating system.

Selecting an Expansion Tank

To properly select the correct expansion tank for a system, you can either use the selection guide tables which are placed near each tank series throughout this product guide (see figure 5) or use a formula to determine the tank volume and acceptance volume requirements. When using a formula, it is necessary to know the water heater capacity, the water supply pressure, the starting and ending water temperatures and the maximum pressure setting of the relief valve.

figure 5

Note: Expansion based on 50°F (10°C) temperature rise.

SUPPLY PRESSURE		WATER HEATER Gallons (Liters)						
psi	bar	20 (76)	30 (114)	40 (152)	50 (190)	80 (304)	100 (380)	120 (456)
40	2.7							
50	3						B	B
55	3.7					B	B	B
60	4					B	B	B
70	4.8					B	B	C
80	5.5			B	B	B	C	C
90	6		B	B	B	C	C	C
100	6.9		B	B	C	C	C	
110	7.5	B	C	C	C			
120	8.2	C						

Tank A
Tank B
Tank C
Multiple tanks required

To select the correct expansion tank, using the selection guides in this product guide, choose the supply pressure (for pressures between those shown, use next highest supply pressure), read across the chart to the correct tank as indicated by the water heater capacity. For capacities between those shown, use next highest capacity.

To accommodate the thermal expansion required for higher temperature and/or higher pressure systems, multiple tanks may be used. Please contact your local authorized Watts representative for assistance in sizing expansion tanks for specific applications requiring multiple tanks.

Series BRV

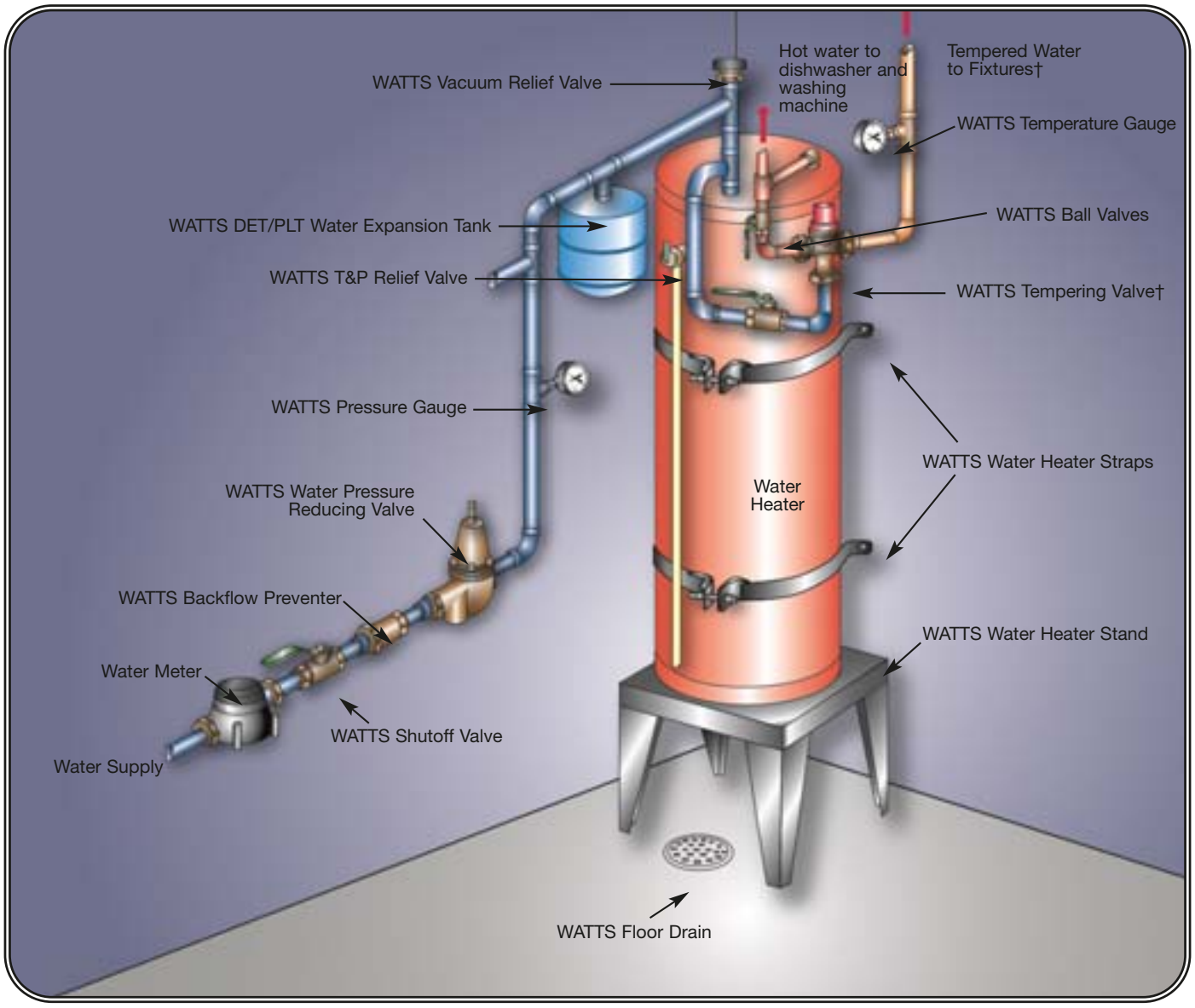
Other Potable Water Thermal Expansion Solutions

Watts offers several other options for pressure relief besides expansion tanks. These products do not prevent against loss of water, like an expansion tank, but they do limit high pressure and prevent the annoying problems associated with thermal expansion. These products include the: Governor 80 combination toilet tank ball cock fill valve and thermal expansion relief valve; the 530C calibrated pressure relief valve; the BRV combination ball valve and relief valve and the H32 hose connection pressure relief valve. These products are described in more detail in the following pages of this product guide.

Control Thermal Expansion

in Hot Water Supply Systems

Thermal expansion of heated water may occur wherever potable water is heated in a closed system (when the potable water is isolated from the public water supply by a one-way valve, such as a pressure reducing valve, backflow preventer or check valve). Watts potable water expansion tanks are designed to absorb the increased volume of water created by thermal expansion and to maintain a balanced pressure throughout the potable water supply system. They are used to prevent plumbing system and/or water heater damage and unnecessary relief valve discharge caused by excessive pressure from thermal expansion.



†ASSE 1016 – Listed valves such as the Watts L111, MMV or USG should be used at point-of-delivery.

Series DET

Potable Water Expansion Tanks for Water Heaters and Hot Water Supply Systems

Models DET-5-M1, DET-12-M1, DET-20-M1 and DET-35-M1

Series DET potable water expansion tanks are designed to absorb the increased volume of water created when the hot water storage tank is heated and to keep the system pressure below the relief setting of the T&P relief valve. It is a prepressurized steel tank with an expansion membrane that prevents contact of the water with the air in the tank. This prevents loss of air to the water and ensures long and trouble-free life for the system. These tanks may be used with all types of direct fired water heaters (gas, oil or electric) and hot water storage tanks.

Standards: DET-5-M1, DET-12-M1, DET-20-M1, and DET-35-M1 are Listed by IAPMO.

(73°F/23°C)

Features

- Rugged flexible butyl diaphragm
- Field adjustable precharge
- In-line and free standing models
- Can be used with most standard water heaters and storage tanks

Specifications: DET-5-M1, DET-12-M1, DET-20-M1

The potable water expansion tank shall be of drawn steel construction and include a rigid polypropylene reservoir liner. It shall have a butyl diaphragm separating the air chamber from the water containing chamber. Inlet connector shall be stainless steel lined. Materials of manufacture for the liner and diaphragm shall be FDA approved. The potable water expansion tank shall be a Watts Series PLT.

Specifications: DET-35-M1

The potable water expansion tank shall be of drawn steel construction. It shall have a butyl diaphragm separating the air chamber from the water containing chamber. Inlet connector shall be brass model (DET-35-M1: stainless steel). Materials of manufacture for the diaphragm shall be FDA approved.

The potable water expansion tank shall be a Watts Model DET-35)-M1.

Note: Watts Series DET-M1 potable water expansion tanks shall be installed on the cold water service pipe line on the supply side of the water heater or water storage tank.

For additional information, request literature ES-DET.

Selection Guide

SUPPLY PRESSURE		WATER HEATER Gallons (Liters)						
psi	bar	20 (76)	30 (114)	40 (152)	50 (190)	80 (304)	100 (380)	120 (456)
40	2.7							
50	3							
55	3.7							
60	4							
70	4.8							
80	5.5							
90	6							
100	6.9							
110	7.5							
120	8.2							

DET-5-MI
DET-12-M1
DET-20-M1
DET-35-M1
Multiple tanks required - consult authorized Watts agent

This table is based upon a relief valve setting of 150psi (10.3 bar), a maximum of 40°F (4°C) temperature rise, and a 20psi (138 kPa) precharge.*

*It is recommended that tanks be precharged to supply pressure (up to 80psi (5.5 bar)). Equalizing precharge pressure to supply pressure increases the application range over those shown in the table.

Model	Connection Size (DN)		Max Pressure		Max Temp.		Tank Volume		Tank Acceptance		Air Precharge		Dia.		Length		Weight	
	in.	mm	psi	bar	°F	°C	Gal.	Liters	Gal.	Liter	psi	kPa	in.	mm	in.	mm	lbs.	kgs.
DET-5-M1	¾ M	20	150	10.3	200	93	2.1	8	1.26	4.8	20	138	8	203	11	279	5.5	2.5
DET-12-M1	¾ M	20	150	10.3	200	82	4.5	17	2.8	10.6	20	138	10½	267	13½	343	10	4.5
DET-20-M1	¾ M	20	150	10.3	200	93	8.5	32	3.2	12	20	138	12½	318	19 13/16	488	15	6.8
DET-35-M1	1 F	20	150	10.3	200	93	14	53	5.6	21	20	138	16	407	21 11/16	552	32	14.6

Series PLT

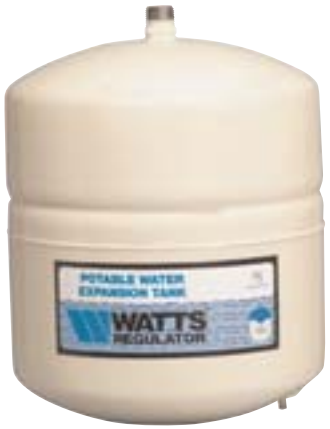
Potable Water Expansion Tanks

Models PLT-5 and PLT-12

Series PLT Potable Water Expansion Tanks are designed to absorb thermal expansion and to maintain balanced pressure throughout the potable water supply system.

Heated water expands, and in a domestic hot water system the system may be closed when isolated from the public water supply by a one-way valve, pressure reducing valve, backflow preventer, check valve, etc. Provisions must be made for this expansion.

Series PLT expansion tanks absorb the increased volume of water created when the hot water storage tank is heated and keeps the system pressure below the relief setting of the T&P relief valve. It is a prepressurized steel tank with an expansion membrane that prevents contact of the water with the air in the tank. This prevents loss of air to the water and ensures long and trouble-free life for the system. These tanks may be used with all types of Direct Fired Hot Water Heaters (gas, oil or electric) and hot water storage tanks.



Model PLT-12 **Model PLT-5**

Standards: PLT-5 and PLT-12 are Listed by IAPMO.

Certified to ANSI/NSF61

Features

- Polypropylene liner
- Rugged flexible butyl diaphragm
- Field adjustable precharge
- Can be used with most standard water heaters and storage tanks
- Made in Taiwan

Specifications

The potable water expansion tank shall be of drawn steel construction and include a rigid polypropylene reservoir liner. It shall have a butyl diaphragm separating the air chamber from the water containing chamber. Inlet connector shall be stainless steel lined. Materials of manufacture for the liner and diaphragm shall be FDA approved. The potable water expansion tank shall be a Watts Series PLT.

For additional information, request literature ES-PLT.

Selection Guide

SUPPLY PRESSURE		WATER HEATER Gallons (Liters)						
psi	bar	20 (76)	30 (114)	40 (152)	50 (190)	80 (304)	100 (380)	120 (456)
40	2.7							
50	3							
55	3.7							
60	4							
70	4.8							
80	5.5							
90	6							
100	6.9							
110	7.5							
120	8.2							

PLT-5
PLT-12
Multiple tanks required - consult factory

This table is based upon a relief valve setting of 150psi (10.3 bar), a maximum of 40°F (4°C) temperature rise, and a 20psi (138 kPa) precharge.*

*It is recommended that tanks be precharged to supply pressure (up to 80psi (5.5 bar)). Equalizing precharge pressure to supply pressure increases the application range over those shown in the table.

Model	Connection Size (DN)		Max. Pressure		Max. Temp.		Tank Volume		Tank Acceptance		Air Precharge		Diameter		Length		Weight	
	in.	mm	psi	bar	°F	°C	gal.	liters	gal.	liters	psi	kPa	in.	mm	in.	mm	lbs.	kgs.
PLT-5	¾ M	20	150	10.3	200	93	2.1	8	1.26	4.8	20	138	8	203	11	279	5.5	2.5
PLT-12	¾ M	20	150	10.3	200	82	4.5	17	2.8	10.6	20	138	10½	267	13½	343	10	4.5

Series DETA

ASME Pressurized Expansion Tanks for Potable Hot Water

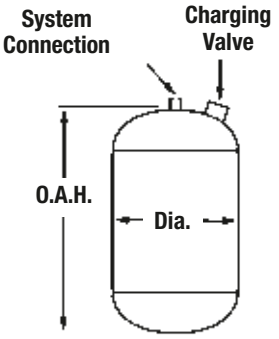
Models DETA 5 – DETA 210

Series DETA tanks are ASME fixed bladder type precharged expansion tanks for commercial and industrial fresh potable hot water applications. They are designed to accept the expanded volume of hot water keeping the system pressure below the relief valve setting. The water is contained in a butyl bladder.

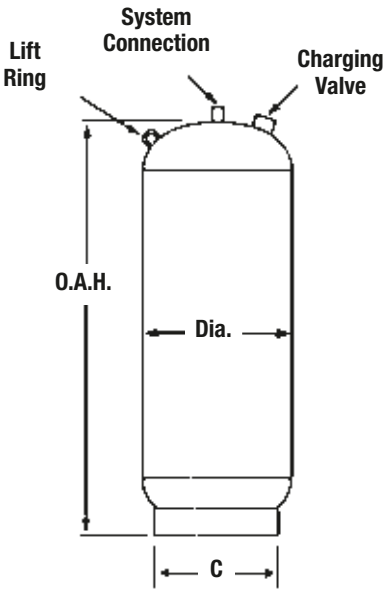
Maximum Design Pressure: DETA 5 – DETA 210: 150psi (10.3 bar)
Precharged to 40psi (276 kPa)
Maximum Design Temperature: 240°F (115°C)

Features

- ASME Section VIII construction
- Fixed butyl bladder (FDA approved)
- Stainless steel system connection
- Precharged to 40psi (276 kPa) (field adjustable)
- Shell: carbon steel
- System connection: stainless steel
- Bladder: butyl (FDA approved)
- Primer coated exterior



DETA 5 and DETA 12



DETA 20 – DETA 210

Specifications

Furnish and install as shown on plans a Watts Model DETA ____ gallon ____ " diameter x ____" (high) precharged steel thermal expansion tank with a fixed butyl bladder. The tank shall have a top NPT stainless steel system connection and a .302" – 32" (7.6 – 812.8mm) charging valve connection (standard tire valve) to facilitate the on-site charging of the tank to meet system requirements. The tank must be constructed in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code.

For additional information, request literature ES-DETA.

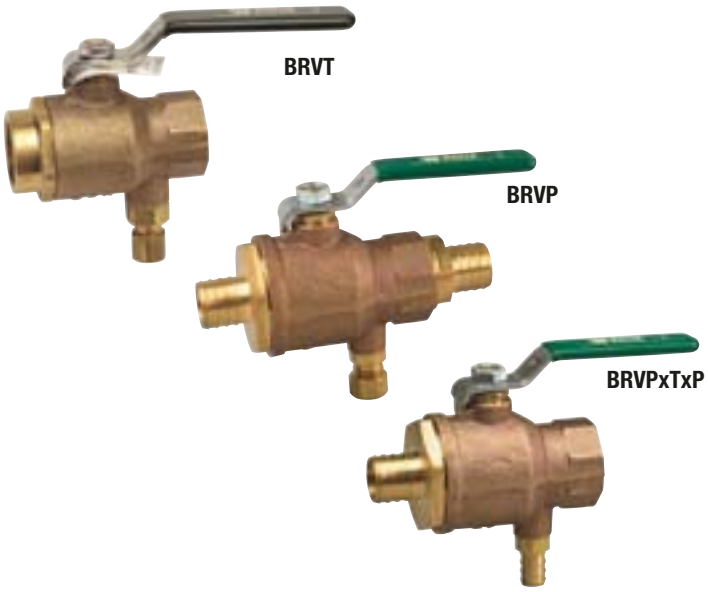
Model	System Connection (DN)		Tank Volume		Acceptance Volume		Max. Operating Pressure		Dimensions (approx.)						Weight	
									Dia.		Height		C			
	in.	*mm*	*Gallons*	*Liters*	*Gallons*	*Liters*	*psig*	*bar*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*
DETA 5	¾	20	3.5	13	2.1	8	150	10.3	10	254	14	356	–	–	22	10
DETA 12	¾	20	5	19	3.1	11.7	150	10.3	12	305	14	356	–	–	28	13
DETA 20	¾	20	8	30	3.1	11.7	150	10.3	12	305	20	508	10	254	34	15
DETA 30	1	25	15	57	10.5	40	150	10.3	16	406	33	838	12	305	64	29
DETA 42	1	25	22	84	15.5	59	150	10.3	16	406	32	813	14	356	88	40
DETA 60	1	25	26	99	15.5	59	150	10.3	16	406	34	864	14	356	93	42
DETA 80	1	25	35	133	15.5	59	150	10.3	16	406	45	1143	14	356	109	49
DETA 100	1	25	45	171	21	80	150	10.3	20	508	38	965	18	457	148	67
DETA 125	1	25	60	228	21	80	150	10.3	20	508	49	1245	18	457	175	79
DETA 160	1½	40	70	266	52.5	199.5	150	10.3	24	610	46	1676	22	559	259	117
DETA 180	1½	40	80	304	52.5	199.5	150	10.3	24	610	49	1168	22	559	268	122
DETA 210	1½	40	90	342	52.5	199.5	150	10.3	24	610	52	1321	22	559	283	128

Lift ring on models DETA 42 – DETA 210.

Series BRV

Combination Ball Valve and Relief Valves

Series BRV combination ball valve and relief valve provides a unique and low cost solution for thermal expansion relief in domestic water heating systems, using a rugged ball valve design. The small and compact BRV facilitates relief of thermal expansion and provides a tight shutoff valve for the supply to the water heater.



Features

- Easy installation - Installs in any position
- Low profile design
- Full port ball valve with virgin PTFE seats
- Blowout proof stem
- Stainless steel spring/Viton® ball relief valve components
- Secure compression or PEX end fitting drain tube connection

Specifications

Water heater shutoff valve shall include built-in relief protection from water pressure in excess of __(80, 100, 125psi). Each valve shall be full port construction, bronze ASTM B-584 body, electro-less nickel plated ASTM B-16 or B-124 brass ball, blowout proof ASTM B-16 brass stem, virgin PTFE seats, PTFE stem packing and stem thrust bearing, Viton® relief ball and 302 stainless steel relief spring. Valves shall include ⅜" (10mm) brass compression or PEX connection for drain line. Valve shall be IAPMO listed. Valve shall be a Watts Series BRV.

Maximum temperature: 210°F (90°C)

Maximum pressure: valve body rated to 400psi (27.6 bar)

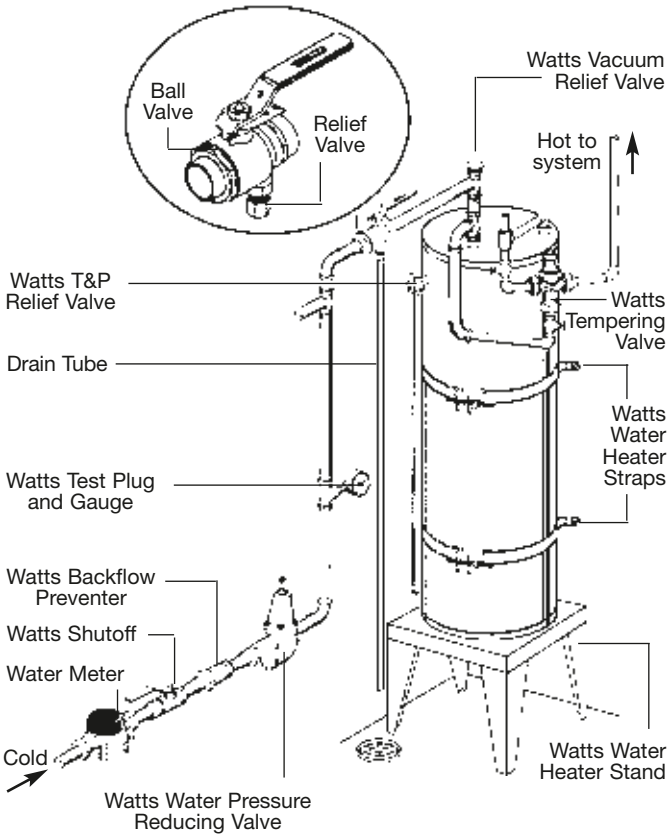
For additional information, request literature ES-BRV.

Available Models

Inlet	Outlet	Relief Outlet
Sweat	Sweat	Compression
Thread	Thread	Compression
PEX	PEX	Compression
PEX	Thread	Compression
PEX	Thread	PEX
PEX	Sweat	Compression
PEX	Sweat	PEX
Thread	PEX	Compression
Sweat	PEX	Compression
PEX	PEX	PEX
Sweat	Sweat	PEX

Available Pressure Settings: 80, 100, 125psi

Typical Installation



Viton® is a registered trademark of DuPont Dow Elastomer

Governor 80-M1

Ball Cock and Thermal Expansion Relief Valve

The Governor 80-M1 is a unique product that solves three plumbing problems at once and offers the most cost effective way to ensure code compliance for domestic water systems

Toilet Tank Ball Cock Fill Valve

The Governor 80-M1 is a toilet tank ball cock fill valve that incorporates the simplest "full flow" ball cock principle available, assuring built in reliability. Its large, non-clogging flow way promotes quiet operation and snap action shutoff under a wide range of pressures. The Governor 80-M1's construction uses PVC and Celcon® to make it completely non-electrolytic and non-corrosive.

Thermal Expansion/Pressure Relief Valve

The Governor 80-M1 gets its name from its ability to govern or limit the domestic water system's preset pressure to 80psi (5.5 bar) as required by code. It protects the primary safety valve on the water heater (the temperature and pressure relief valve) from unnecessary blow off or discharge, which can cause potentially dangerous problems and costly water damage. The Governor 80-M1 discharges any extra volume of water generated by thermal expansion into the water closet, eliminating the need for the installation of more expensive expansion tanks and auxiliary relief valves and their discharge lines.

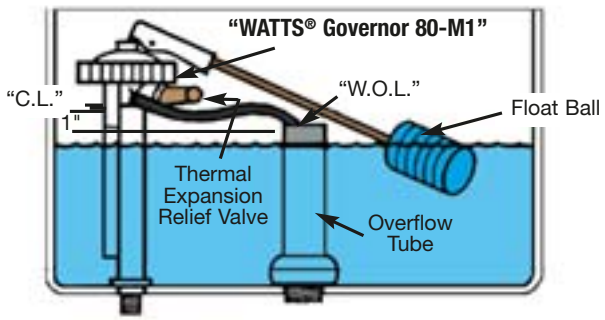
Anti-Siphon Backflow Preventer

The Governor 80-M1 is also an anti-siphon backflow preventer and protects against backflow from water closets, a serious cross-connection. This added protection ensures that water from the water closet will not contaminate the potable water supply.

Features

- Limits and governs the domestic water system's preset static pressure to 80psi (5.5 bar) as required by code
- Protects the Temperature and Pressure Relief Valve on the water heater from unnecessary relief discharge, reserving it for true emergencies
- Reduces the need to use a more expensive thermal expansion tank or auxiliary relief valve which require a drain line
- Prevents backflow from water closets, a serious cross-connection
- ASSE 1002 certified and meets IAPMO and CSA requirements for anti-siphon ball cocks

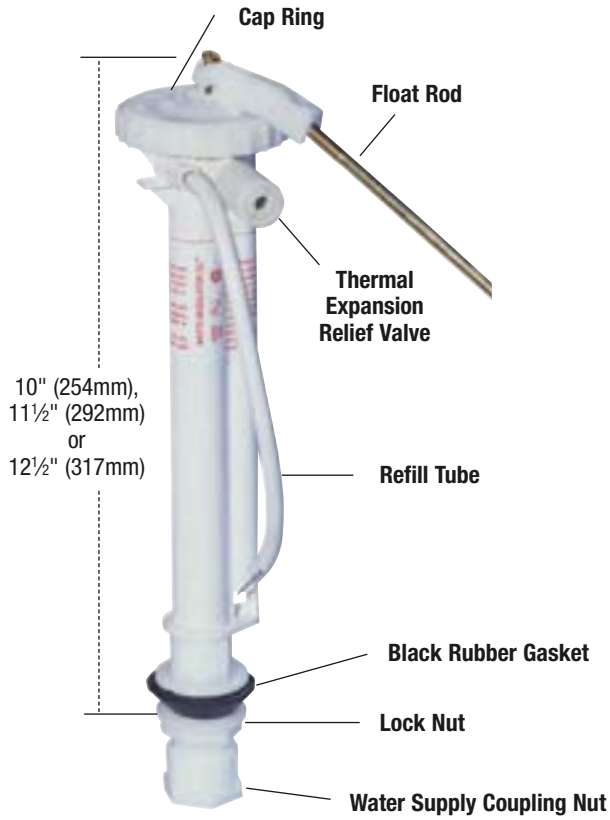
TYPICAL WATER CLOSET



"C.L." (Critical level established)
"W.O.L." (Water overflow level)

Celcon® is a registered trademark of Celanese, Limited.

Patent #4,745,945



Specifications

The Watts Governor 80-M1 is tested and certified under ASSE Standard 1002 and meets IAPMO, and CSA requirements for anti-siphon ball cocks. All materials in contact with water are FDA approved under DVR-21-177-2600. The thermal expansion relief valve is standardly set at 80psi (5.5 bar) to meet existing codes and is non-adjustable. Standard lengths are: 10", 11½" or 12½" (254, 292 or 317mm).

Ordering Information

Model	Size (DN)	
	in.	*mm*
Gov. 80-M1-10	10	254
Gov. 80-M1-11.5	11½	292
Gov. 80-M1-12.5	12½	317

IAPMO listed B125 1002

For additional information, request literature S-GOV80.

Series 530C

Calibrated Pressure Relief Valves

Series 530C are spring operated bronze relief valves designed to be used only as protection from the build up of excessive pressure in systems containing water, oil or air.

Series 530C are not ASME approved safety relief valves and should not be used in system applications with this requirement.

Series 530C incorporates a calibrated adjustment feature for manually setting the valve to the relief pressure required.

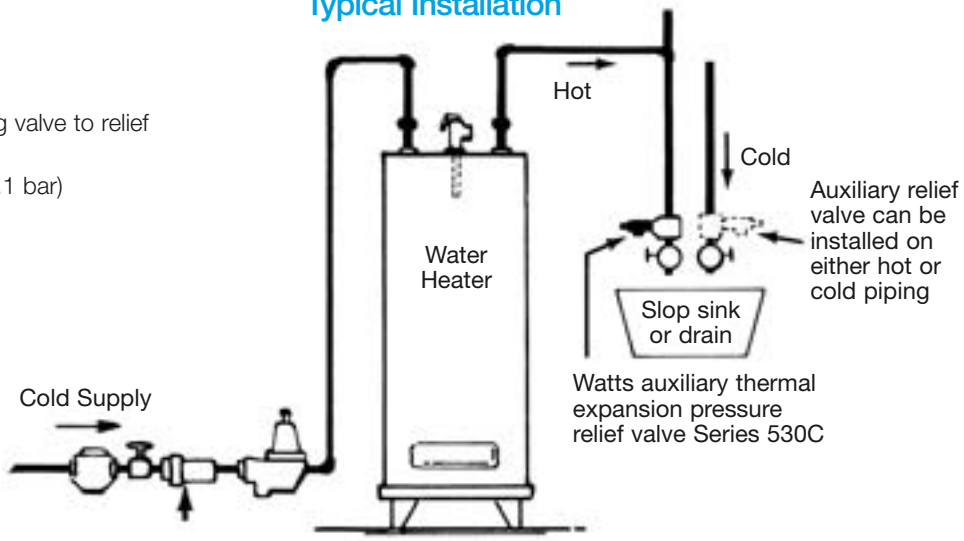
Features

- Calibrated adjustment feature for setting valve to relief pressure required
- Adjustable range 50 – 175psi (3.5 – 12.1 bar)
- All bronze construction
- All stainless steel springs
- Buna-N disc on machined body seat

Specifications

Sizes ½" and ¾" (15 & 20mm).
Inlet (bottom) male threaded, NPT.
Outlet (side), female threaded, NPT.

Typical Installation



Model	Size (DN)		Height		Width		Weight	
	in.	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*gm.*
530C	½	15	3	76	1⅝"	41	.63	286
530C	¾	20	3	76	1⅝"	41	.63	286

For additional information, request literature ES-530C.

Series H32

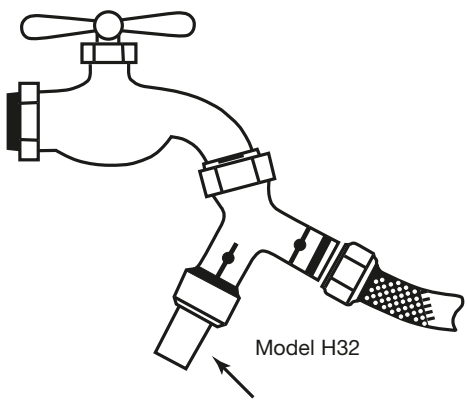
Hose Connection Pressure Relief Valve

The H32 hose connection pressure relief valve, set at 80psi (5.5 bar) or 100psi (6.8 bar), has a ¾" (20mm) hose connection inlet for ease of installation.

The H32 should only be used in areas where the outside temperature does not fall below freezing year round.

Model	Size (DN)	
	in.	*mm*
H32-100	¾	20
H32-80	¾	20

Typical Installation



Series 276H300, IWTG

Water Pressure Test Gauge

Ideal to accurately determine system pressure in a building. The ¾" (20mm) hose connection easily attaches to a hose bibb or the drain connection on a water heater. A red indicator hand holds at the highest reading registered. When left on overnight, it will register the highest pressure in the system during that period.

(A)

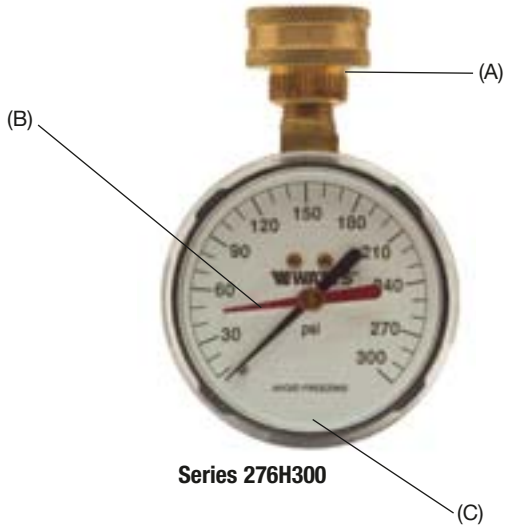
¾" (20mm) H.T. Hose Connection which easily attaches to an outside hose bibb or to the drain connection on a water heater.

(B)

A Red indicator hand that "HOLDS" at the highest reading registered, to record shock pressure or when left on overnight will register the highest surge pressure which occurred during that period.

(C)

Features a large (2½" (65mm)) face for easy reading.



Series 276H300

Model	Size (DN)		Range	
	in.	*mm*	*psi*	*bar*
276H300	¾	20	0 – 300	0 – 21
IWTG	¾	20	0 – 200	0 – 14

Series SCV

Service Check Valves

Series SCV service check valves facilitate the servicing of components in systems under pressure. They install between the system and the component.

As the component is threaded into the Service Check Valve, the spring loaded valve opens to system pressure.

As the component is removed, the valve closes, maintaining system integrity while the component is being inspected. This prevents having to drain the entire system each time a component is serviced.

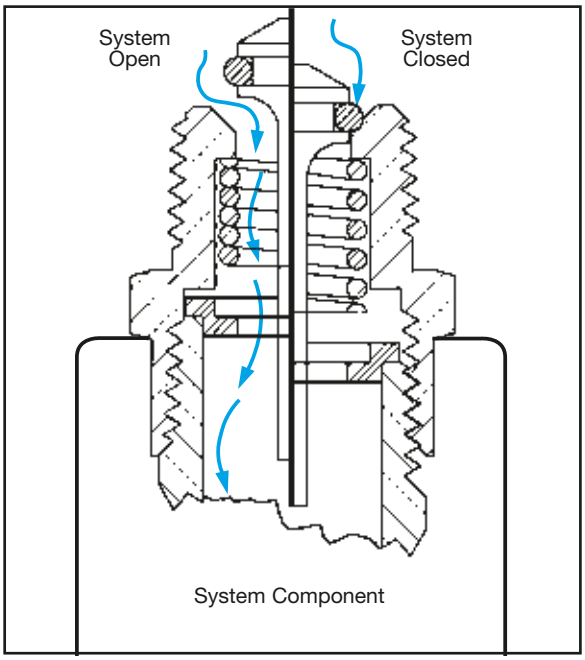
Model.	Size (DN)	
	in.	*mm*
SCV	⅛	3.2
SCV	¼	6.4
SCV	⅜	9.5
SCV	½	12.7
SCV	¾	20

Note: This device is not to be used on safety relief valves or other safety or flow sensitive components.

Important: System pressure must be reduced prior to removing system component.

Available in sizes
⅛", ¼", ⅜", ½" and ¾" (3.2, 6.3, 9.5, 12.7, 20mm) inches.
Max. Temperature: 240°F (115°C), Max. Pressure: 150psi (10 bar)

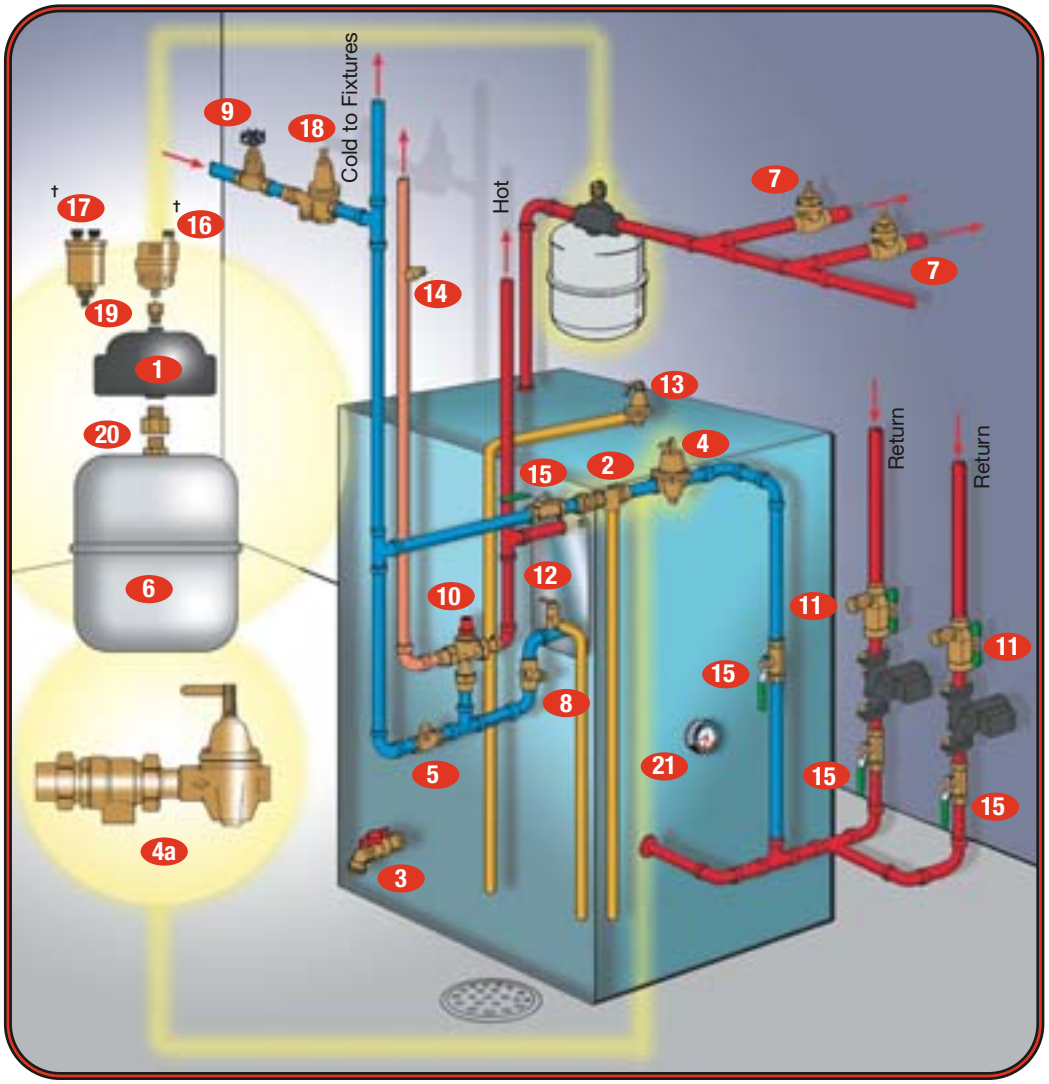
Typical Installation



Control Thermal Expansion

in Hot Water Heating Systems

Thermal expansion of heated water may occur wherever water is heated in a closed system (when the boiler water is isolated from the public water supply by a one-way valve, such as a feed water pressure reducing valve, backflow preventer, check valve, etc.). Watts Nonpotable water expansion tanks are designed to absorb the increased volume of water caused by thermal expansion and maintain a balanced pressure throughout the hot water heating system. They are used to prevent system damage and unnecessary relief valve discharge caused by excessive pressure from thermal expansion.



1 Air Separator
2 Backflow Preventer
3 Boiler Drain Valve
4 Boiler Fill Valves
4a Combination Fill Valve and Backflow Preventer
5 Bronze Check Valve
6 Expansion Tank
7 Flow Checks
8 Flow Control Valve
9 Gate or Globe Valves
10 Mixing Valves
11 Purge Valves
12 Pressure Relief Valves
13 Hot Water Boiler Safety Relief Valve
14 T&P Test Plug
15 Ball Valve
† 16 Float Vent Valve
† 17 Automatic Float Vent Valve
18 Water Pressure Reducing Valve
19 ⅛" (3mm) or ¼" (8mm) Service Check Valves
20 ½" (15mm) Service Check Valve
21 Combination Temperature & Pressure Gauge

† Choose one item #16 or #17

Series ETX-ASF

Combination Packages

Series ETX-ASF hydronic boiler combination packages make it easier to buy system components by including an ETX expansion tank, AS air separator, and FV4-M1 float vent valve all in one package and for a lower cost than buying each of the components separately.

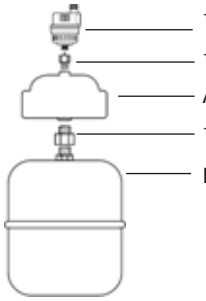
Model	Air Separator		Float Vent FV-4M1		Expansion Tank		
	1" (25mm)	1¼" (32mm)	⅛" (3mm)	⅛" (3mm)	ETX-15	ETX-30	ETX-60
Combination Packages							
ETX-15-ASF	X		X		X		
ETX-15-ASF		X	X		X		
ETX-30-ASF	X		X			X	
ETX-30-ASF		X	X			X	
ETX-60-ASF	X		X				X
ETX-60-ASF		X	X				X

Series HPX

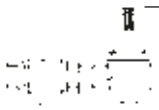
Boiler Trim-Out Packages

Series HPX boiler trim-out packages contain all the essential trim-out components of a quality boiler installation in a single easy to carry package.

Package Includes:



⅛" (3mm), FV4-M1 Float Vent
⅛" (3mm) SCV
AS Air Separator 1" or 1¼" (25 or 32 mm)
½" (13mm) SCV ETX-30
Expansion Tank



911S or B911S Combination Backflow Preventer and Boiler Fill Valve

Package Selection Chart

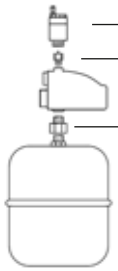
Model	Air Separator		Service Check Valve		Float Vent		Fill Valve	Fill Valve/ Backflow Preventer		Flow Check	Expansion Tank	
	1" (25mm)	1¼" (32mm)	⅛" (3mm)	½" (15mm)	FV-4M1 ⅛" (3mm)	DuoVent ⅛" (3mm)	B1156	911S	B911S	2000S-M5 1" (25mm)	ETX-15	ETX-30
Boiler Trim-out Packages												
HPX-C	X		X	X	X			X				X
HPX-D		X	X	X	X			X				X
HPX-15C	X		X	X	X			X			X	
HPX-15D		X	X	X	X			X			X	
HPX-30 BC	X		X	X		X			X			X
HPX-30 BD		X	X	X		X			X			X
HPX-15 BC	X		X	X		X			X		X	
HPX-15 BD		X	X	X		X			X		X	

Series HPX Bronze

Bronze Boiler Trim Packages

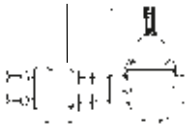
Series HP bronze boiler trim packages contain all the essential trim-out components of a quality boiler installation in a single easy to carry package. These packages include a bronze air Separator and bronze combination fill valve/backflow preventer.

Package Includes:



½" FV4-M1 Float Vent
½" SCV Service Check
1" or 1¼" AS-B Air Separator
½" SCV Service Check
ETX-30 or ETX-15 Expansion Tank

B911S Combination Backflow Preventer and Boiler Fill Valve



Package Selection Chart

MODEL	AIR SEPARATOR				SERVICE CHECK VALVE	FLOAT VENT	FILL VALVE/ BACKFLOW PREVENTER	EXPANSION TANK	
	AS-B-S		AS-B-T						
	1"	1¼"	1"	1¼"	½"	FV-4M1 ½"	B911S ½"	ETX-15 ½"	ETX-30 ½"
HPX-15C-AB-S	X				2	X	X	X	
HPX-15D-AB-S		X			2	X	X	X	
HPX-15C-AB-T			X		2	X	X	X	
HPX-15D-AB-T				X	2	X	X	X	
HPX-30C-AB-S	X				2	X	X		X
HPX-30D-AB-S		X			2	X	X		X
HPX-30C-AB-T			X		2	X	X		X
HPX-30D-AB-T				X	2	X	X		X

Series ETX, ETSX

Pressurized Expansion Tanks for Heating and Cooling Systems*

Series ETX and ETSX Pressurized Expansion Tanks for Heating and Cooling Systems are designed to absorb the increased volume of water created when water is heated. These tanks maintain system pressure below the relief setting of the relief valve. The Series ETX and ETSX's prepressurized steel tank features a durable expansion membrane that prevents contact of the water with the air in the tank. This rugged diaphragm minimizes loss of the air change and ensures long and trouble-free life for the system.

Series ETX

Features

- Precharged at 12psi (83 kPa)
- Rugged flexible butyl diaphragm
- In-line and free standing models
- Compatible with glycol in systems
- Steel construction

Models

ETX	Mounts to supply piping
ETSX	Free standing

Specifications

Furnish and install as shown on plans a Watts Model ETX/ETSX _____ gallon _____ " diameter x ____ " (high) precharged steel expansion tank with a fixed butyl bladder. The tank shall have an NPT system connection and a .302"-32 charging valve connection (standard tire valve) to facilitate the on-site charging of the tank to meet system requirements. The tank shall be factory precharged to 12psi. The tank shall be a Watts Series ETX or ETSX.

Maximum Working Temperature: 220˚F (115˚C)

Maximum Working Pressure:

ETX-15, ETX-30, ETX-60: 75psi (517 kPa)

ETX-90 and ETSX Series: 100psi (6.9 bar)

Precharge (field adjustable): 12psi (83 kPa)

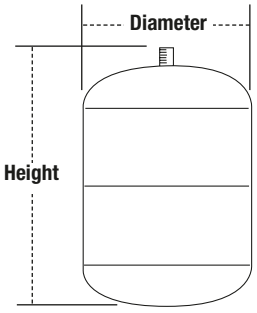
*Not for use on potable water systems.

Series ETSX

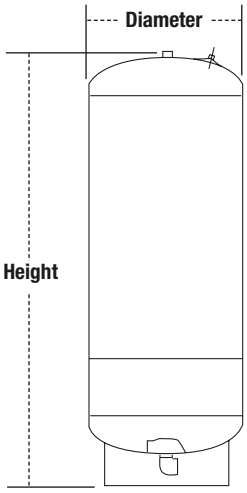
Quick Sizing Chart

Boiler Output Net BTU/H	Finned Tube Baseboard	Convectors or Unit Heaters	Cast Iron Radiators	Cast Iron Baseboard
	Suggested Selection			
20,000	ETX-15	ETX-15	ETX-15	ETX-15
30,000	ETX-15	ETX-15	ETX-15	ETX-15
40,000	ETX-15	ETX-30	ETX-30	ETX-30
50,000	ETX-15	ETX-30	ETX-30	ETX-30
60,000	ETX-30	ETX-30	ETX-60	ETX-60
70,000	ETX-30	ETX-30	ETX-60	ETX-60
80,000	ETX-30	ETX-30	ETX-60	ETX-60
90,000	ETX-30	ETX-30	ETX-60	ETX-60
100,000	ETX-30	ETX-60	ETX-60	ETX-60
125,000	ETX-30	ETX-60	ETX-60	ETX-90
150,000	ETX-30	ETX-60	ETX-90	ETX-90
175,000	ETX-60	ETX-60	ETX-90	ETX-90
200,000	ETX-60	ETX-60	ETX-90	ETX-90
250,000	ETSX-30	ETSX-30	ETSX-40	ETSX-30
300,000	ETSX-30	ETSX-40	ETSX-40	ETSX-30
350,000	ETSX-30	ETSX-40	ETSX-60	ETSX-30
400,000	ETSX-30	ETSX-60	ETSX-90	ETSX-40
500,000	ETSX-40	ETSX-60	ETSX-90	ETSX-40
600,000	ETSX-40	ETSX-90	ETSX-90	ETSX-60
700,000	ETSX-60	ETSX-90	ETSX-90	ETSX-60
800,000	ETSX-60	ETSX-110	ETSX-110	ETSX-90
900,000	ETSX-60	ETSX-110	ETSX-110	ETSX-90
1,000,000	ETSX-90	ETSX-110	ETSX-110	ETSX-90
1,200,000	ETSX-90	ETSX-110	ETSX-160	ETSX-90
1,400,000	ETSX-110	ETSX-160	ETSX-160	ETSX-110
1,500,000	ETSX-110	ETSX-160	ETSX-110 (2)	ETSX-110

Note: These recommendations are based on the average water volume of typical closed systems.
Fill pressure 12psi, relief valve set pressure of 30psi and system temperature of 200˚F.



ETX



ETSX

Model	Connection Size (DN)		Tank Volume		Accept. Volume		Diameter		Height		Weight	
	gal.	*liters*	*gal.*	*liter*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*
ETX-15	½" MNPT	15	2.1	7.9	1.0	3.8	8	203	12½	318	0.5	0.23
ETX-30	½" MNPT	15	4.5	17.1	2.5	9.5	11	279	14	356	10.0	4.54
ETX-60	½" MNPT	15	6.0	22.8	3.0	11.4	11⅜	290	17 3/16	437	11.5	5.22
ETX-90	¾" MNPT	20	15.0	57.0	6.0	22.8	16	406	20 13/16	528	28.0	12.70
ETSX-30	1" FNPT	25	15.0	57.0	6.0	22.8	16	406	21 11/16	551	32.0	14.51
ETSX-40	1" FNPT	25	20.0	76.0	8.0	30.4	16	406	28 13/16	732	39.0	17.69
ETSX-60	1" FNPT	25	33.0	125.4	13.3	50.5	16	406	42 13/16	1087	57.0	28.85
ETSX-90	1¼" FNPT	32	44.0	167.2	17.7	67.3	21	533	36 3/16	919	72.0	32.66
ETSX-110	1¼" FNPT	32	62.0	235.6	24.9	94.6	21	533	47⅞	1217	112.0	50.80
ETSX-160	1¼" FNPT	32	81.0	307.8	32.6	123.9	21	533	62	1575	123.0	55.79

Series ETA

ASME Pressurized Expansion Tanks for Heating and Cooling Systems

Models ETA 15 – ETA 240

Series ETA tanks are ASME fixed bladder type precharged expansion tanks. They are designed to absorb the expansion forces and control the pressure in heating and cooling systems. The water is contained in the heavy duty bladder preventing tank corrosion and waterlogging problems.

Features

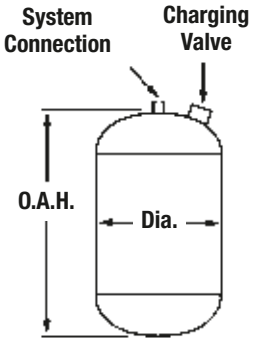
- ASME Section VIII Construction
- Heavy duty butyl bladder
- Precharged to 12psi (83 kPa) (Field Adjustable)
- Shell: Carbon steel
- Bladder: Heavy duty butyl
- Primer coated exterior

Specifications

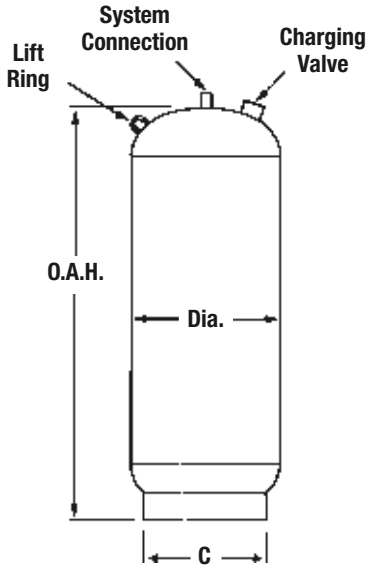
Furnish and install as shown on plans a Watts Model ETA ____ gallon ____ " diameter x ____" (high) precharged steel expansion tank with a fixed butyl bladder. The tank shall have a top NPT system connection and a .302" – 32" (7.6 – 812.8mm) charging valve connection (standard tire valve) to facilitate the on-site charging of the tank to meet system requirements. The tank must be constructed in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code.

Maximum Design Pressure:
ETA 15 – ETA 60: 150psi (10.3 bar)
ETA 80 – ETA 240: 125psi (8.6 bar)
Precharged to 12psi (83 kPa)
Maximum Design Temperature: 240°F (115°C)

For additional information, request literature ES-ETA.



ETA 15 and ETA 20



ETA 40 – ETA 240

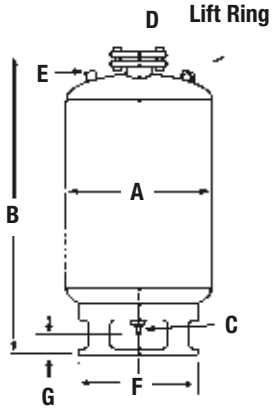
Model	System Connection Size (DN)		Tank Volume		Acceptance Volume		Max. Operating Pressure		Dimensions (approx.)						Weight	
									Dia.		Height		C			
	in.	*mm*	*Gals.*	*Liters*	*Gals.*	*Liters*	*psig*	*bar*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*
ETA 15	¾	20	7.8	29.6	2.5	9.5	150	10.3	12	305	19	483	–	–	42	19
ETA 20	¾	20	10.9	41.4	2.5	9.5	150	10.3	12	305	26	660	–	–	52	24
ETA 40	1	25	25	95	10	38	150	10.3	16	406	33	838	12	305	84	38
ETA 60	1	25	35	133	10	38	150	10.3	16	406	45	1143	12	305	97	44
ETA 80	1	25	45	171	21	80	125	8.6	20	508	38	968	18	457	148	67
ETA 100	1	25	60	228	21	80	125	8.6	20	508	49	1245	18	457	175	79
ETA 120	1½	40	70	266	48	182.4	125	8.6	24	610	46	1168	22	559	259	117
ETA 144	1½	40	80	304	48	182.4	125	8.6	24	610	49	1245	22	559	268	122
ETA 180	1½	40	90	342	48	182.4	125	8.6	24	610	52	1321	22	559	283	128
ETA 200	1½	40	115	437	48	182.4	125	8.6	24	610	66	1676	22	559	325	147
ETA 240	1½	40	140	532	52	197.6	125	8.6	24	610	78	1981	22	559	362	164

Series ET-RA

ASME Pressurized Expansion Tanks for Heating and Cooling Systems

Models ET-RA 35 – ET-RA 2000

Series ET-RA tanks are ASME removable bladder type precharged expansion tanks. They are designed to absorb the expansion forces and control the pressure in heating and cooling systems. The water is contained in the heavy duty bladder, preventing tank corrosion and waterlogging problems.



ET-RA 85 – ET-RA 800

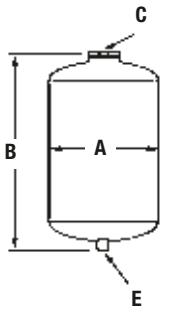
Features

- ASME Section VIII Code Construction
- Removable butyl bladder
- Precharged to 12psi (83 kPa) (Field Adjustable)
- Shell: Carbon steel
- Bladder: Heavy duty butyl
- Primer coated exterior

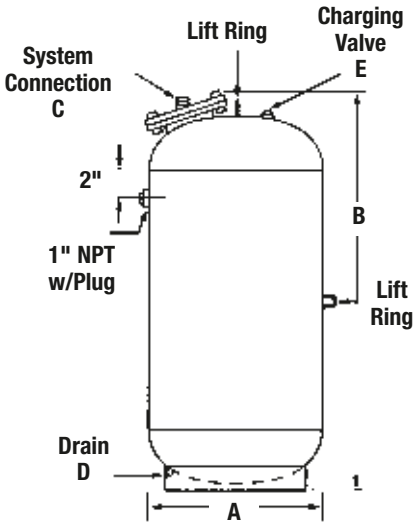
Specifications

Furnish and install as shown on plans a Watts Model ET-RA ____ gallon ____ " diameter x ____" (high) precharged steel expansion tank with a heavy duty butyl rubber bladder. The tank shall have NPT system connections and a .302" - 32" (7.6 – 812mm) charging valve connection (standard tire valve) to facilitate the on-site charging of the tank to meet system requirements. The tank must be constructed in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code.

Maximum Design Pressure: 125psi* (8.6 bar)
Maximum Design Temperature: 240°F (115°C)
Precharged to 12psi (83 kPa)
*Models with 200 and 250psi ratings are available.



ET-RA 35 and ET-RA 50



ET-RA 1000 – ET-RA 2000

For additional information, request literature ES-ET-RA.

Model	Tank Volume		Tank A (DN)		Dimensions (approx.) B		C		D		E	F		G		Weight	
	Gals.	Liters	in.	mm	in.	mm	in.	mm	in.	mm		in.	mm	in.	mm	lbs.	kgs.
ET-RA 35	10	38	12	305	25	635	¾	19	–	–	.302"	–	–	–	–	40	18
ET-RA 50	13	49.4	14	356	25	635	¾	19	–	–	-32NC	–	–	–	–	50	23
ET-RA 85	23	87.4	16	400	37	940	1	25	½	13	–	12	305	5½	140	90	41
ET-RA 130	35	133	20	508	37	940	1	25	½	13	–	16	406	5½	140	125	57
ET-RA 200	53	201.4	24	610	43	1092	1½	38	½	13	.302"	20	508	5¼	133	210	95
ET-RA 300	79	300	24	610	55	1397	1½	38	¾	19	-32NC	20	508	5¼	133	225	102
ET-RA 400	106	402.8	30	750	49	1245	1½	38	¾	19	–	24	610	5¼	133	300	136
ET-RA 500	132	501.6	30	750	57	1448	1½	38	¾	19	–	24	610	5¼	133	335	152
ET-RA 600	158	600.4	30	750	65	1651	1½	38	¾	19	–	24	610	5¼	133	360	163
ET-RA 800	211	801.8	36	900	63	1600	1½	38	¾	19	–	30	762	5¼	133	475	215
ET-RA 1000	264	1003.2	36	900	74	1880	1½	38	¾	19	–	–	–	–	–	710	322
ET-RA 1200	317	1204.6	36	900	86	2184	1½	38	¾	19	–	–	–	–	–	720	327
ET-RA 1400	370	1406	36	900	99	2515	1½	38	¾	19	.302"	–	–	–	–	875	397
ET-RA 1600	422	1603.6	48	1200	72	1829	1½	38	¾	19	-32NC	–	–	–	–	1100	499
ET-RA 2000	528	2006.4	48	1200	85	2159	1½	38	¾	19	–	–	–	–	–	1280	581

Note: Models ET-RA 85 – ET-RA 800 have both top and bottom connections (C and D) to access the bladder.

NOTES

For Technical Assistance Call Your Authorized Watts Agent.

			Telephone #	Fax #
	HEADQUARTERS: Watts Regulator Company	815 Chestnut St., North Andover, MA 01845-6098 U.S.A.	978 688-1811	978 794-1848
North East	BWA Company	17610 S. Waterloo Rd., Cleveland, OH 44119	216 486-1010	216 486-2860
	Disney McLane & Associates	428 McGregor Ave., Cincinnati, OH 45206	800 542-1682	877 476-1682
	Edwards, Platt & Deely, Inc.	271 Royal Ave., Hawthorne, NJ 07506	973 427-2898	973 427-4246
	Edwards, Platt & Deely, Inc.	368 Wyandanch Ave., North Babylon, NY 11703	631 253-0600	631 253-0303
	J. B. O'Connor Company, Inc.	P.O. Box 12927, Pittsburgh, PA 15241	724 745-5300	724 745-7420
	RMI	Glenfield Bus. Ctr., 2535 Mechanicsville Tpk., Richmond, VA 23223	804 643-7355	804 643-7380
	The Joyce Agency, Inc.	8442 Alban Rd., Springfield, VA 22150	703 866-3111	703 866-2332
	Vernon Bitzer Associates, Inc.	980 Thomas Drive, Warminster, PA 18974	215 443-7500	215 443-7573
	W. P. Haney Co., Inc.	51 Norfolk Ave., South Easton, MA 02375	508 238-2030	508 238-8353
	WMS Sales, Inc. (Main office)	9580 County Rd., Clarence Center, NY 14032	716 741-9575	716 741-4810
South East	Billingsley & Associates, Inc.	2728 Crestview Ave., Kenner, LA 70062-4829	504 602-8100	504 602-8106
	Billingsley & Associates, Inc.	478 Cheyenne Lane, Madison, MS 39110	601 856-7565	601 856-8390
	Francisco J. Ortiz & Co., Inc.	Charlyn Industrial Pk., Road 190 KM1.9 - Lot #8, Carolina, Puerto Rico 00983	787 769-0085	787 750-5120
	Mid-America Marketing, Inc.	203 Industrial Drive, Birmingham, AL 35211	205 879-3469	205 870-5027
	Mid-America Marketing, Inc.	1364 Foster Avenue, Nashville, TN 37210	615 259-9944	615 259-5111
	Mid-America Marketing, Inc.	5466 Old Hwy. 78, Memphis, TN 38118	901 795-0045	901 795-0394
	Smith & Stevenson Co., Inc.	4935 Chastain Ave., Charlotte, NC 28217	704 525-3388	704 525-6749
	Harry Warren, Inc.	1400 North Orange Blossom Trail, Orlando, FL 32804	407 841-9237	407 841-9246
	Watts Georgia	2861-B Bankers Industrial Drive, Atlanta, GA 30360	770 209-3310	770 447-4583
North Central	Dave Watson Associates	1325 West Beecher, Adrian, MI 49221	517 263-8988	517 263-2328
	Mid-Continent Marketing Services Ltd.	1275 Lakeside Drive, Romeoville, IL 60446	630 953-1211	630 953-1067
	Soderholm & Associates, Inc.	7150 143rd Ave. N.W., Anoka, MN 55303	763 427-9635	763 427-5665
	Stickler & Associates	333 North 121 St., Milwaukee, WI 53226	414 771-0400	414 771-3607
South Central	Hugh M. Cunningham, Inc.	13755 Benchmark, Dallas, TX 75234	972 888-3808	972 888-3838
	HMC Sandia Group	13755 Benchmark, Dallas, TX 75234	505 222-3134	800 339-0191
	Mack McClain & Associates	4407 Meramec Bottom, Suite G, St. Louis, MO 63129	314 894-8188	314 894-8388
	Mack McClain & Associates, Inc.	1450 NE 69th Place, Ste. 56 Ankeny, IA 50021	515 288-0184	515 288-5049
	Mack McClain & Associates, Inc.	15090 West 116th St., Olathe, KS 66062	913 339-6677	913 339-9518
	OK! Sales, Inc.	214 NE 12th. St., Ste A Moore, OK 73160	405 794-5200	405 794-5250
Western	Delco Sales, Inc.	1930 Raymer Ave., Fullerton, CA 92833	714 888-2444	714 888-2448
	Delco Sales, Inc.	111 Sand Island Access Rd., Unit I-10, Honolulu, HI 96819	808 842-7900	808 842-9625
	Fanning & Associates, Inc.	6765 Franklin St., Denver, CO 80229-7111	303 289-4191	303 286-9069
	Hollabaugh Brothers & Associates	6915 South 194th St., Kent, WA 98032	253 867-5040	253 867-5055
	Hollabaugh Brothers & Associates	3028 S.E. 17th Ave., Portland, OR 97202	503 238-0313	503 235-2824
	P I R Sales, Inc.	3050 North San Marcos Place, Chandler, AZ 85225	480 892-6000	480 892-6096
	Preferred Sales	30852 Huntwood Ave., Hayward, CA 94544	510 487-9755	510 476-1595
	R. E. Fitzpatrick Sales, Inc.	4109 West Nike Dr. (8250 South), West Jordan, UT 84088	801 282-0700	801 282-0600
Canada	Watts Industries (Canada) Inc. (Watts Regulator Co. Division)	5435 North Service Road, Burlington, Ontario L7L 5H7	905 332-4090	905 332-7068
	Con-Cur West Marketing, Inc.	71B Clipper Street, Coquitlam, British Columbia V3K 6X2	604 540-5088	604 540-5084
	D.C. Sales Ltd.	#13-6130 4th St. S.E., Calgary, Alberta T2H 2B6	403 253-6808	403 259-8331
	D.C. Sales Ltd.	16726 111 Ave, Edmonton, Alberta T5M 2S6	780 496-9495	780 496-9621
	GTA Sales Team.	Greater Toronto Area	888 208-8927	888 479-2887
	Hydro-Mechanical Sales, Ltd.	3700 Joseph Howe Drive, Suite 1, Halifax, Nova Scotia B3L 4H7	902 443-2274	902 443-2275
	Hydro-Mechanical Sales, Ltd.	P.O. Box 1445 (Mailing), 297 Collishaw St., Suite 7 (shipping) Moncton, New Brunswick E1C 9R2	506 859-1107	506 859-2424
	J.D.S. Sales Ltd.	4 Lancaster Street, St. John's, Newfoundland A1A 5P7	709 579-5771	709 579-1558
	Les Ent. Roland Lajoie	6221 Marivaux, St-Leonard, QC H1P 3H6	514 328-6645	514 328-6131
	Les Ent. Roland Lajoie	23 du Buisson, Pont Rouge, QC G3H 1X9	418 873-2500	418 873-2505
	Mar-Win Agencies, Ltd.	1333 Clifton St., Winnipeg, Manitoba R3E 2V1	204 775-8194	204 786-8016
	Northern Mechanical Sales	P.O. Box 280 (mailing) 163 Pine St. (shipping), Garson, Ontario P3L 1S6	705 693-2715	705 693-4394
	Palser Enterprises, Ltd.	P.O. Box 28136 (mailing), 1885 Blue Heron Dr., #4, London, Ontario N6H 5L9	519 471-9382	519 471-1049
	RAM Mechanical Marketing Inc.	905 Winnipeg Street, Regina, Saskatchewan S4R 1J1	306 525-1986	306 525-0809
	RAM Mechanical Marketing Inc.	510 Ave M South, Saskatoon, Saskatchewan S7M 2K9	306 244-6622	306 244-0807
	Walmar Mechanical Sales	24 Gurdwara Rd., Nepean, Ontario K2E 8B5	613 225-9774	613 225-0673
	EXPORT Hdqtrs.: Watts Regulator Co.	815 Chestnut St., North Andover, MA 01845-6098 U.S.A.	978 688-1811	978 794-1848

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