Flow-Through Expansion Tanks

Taco flow-through expansion tanks are designed to help reduce the environmental conditions that help bacteria flourish. The full acceptance Captive Air design provides separation of air and water for optimal efficiency. These tanks come in a variety of sizes and capacities to fit your potable water application needs.

Featuring

eLink® Taco Connectivity

Taco Comfort Solutions®
A Taco Family Company

Supersedes: New

Effective Date: 05/04/22
Printed in USA

Features & benefits

Beat the Bacteria . . .

- Stagnant water can provide conditions in which bacteria thrive
- In man-made hydronic systems, these bacteria can grow to harmful levels
- Serious illness can be caused by inhaling water droplets that contain these harmful levels of bacteria

Eliminate Pressure and Flow problems

- Better comfort - eliminate flow problems
- Eliminate water logged expansion tanks
- Reduce expansion tank sizes up to 80%
- Eliminate expansion tank corrosion problems
- Reduce problems with burst bladder

Dramatically Reduce Expansion Tank Sizes

Captive Air expansion tanks eliminate the excessive volume of water that is required to compress atmospheric pressure air in a plain steel tank to the fill pressure. This allows a reduction in Captive Air expansion tank sizes by up to 80% compared to air cushion plain steel tanks.

CAF Specifications

- Two port 304 stainless steel system connections
- Full acceptance bladder type for permanent separation of air and water
- Carbon steel construction with red oxide primer finish

	Standard	Optional
Working Pressure	125 PSIG (862 KPA)	150, 250 or higher
Operating Temperature	240˚F (116C) (max)	

Benefits of the Flow-Through Design

- True flow-through design prevents stagnant water from residing in your hydronic systems
- Heavy duty butyl bladders are resistant to bacteria growth
- Reduces the environmental conditions in which bacteria flourish

For applications requiring NSF/ANSI 61-G Cerification

Our CAF Model expansion tanks come standard with NSF/ANSI 61-G Certification.

NSF Certified to NSF/ANSI/CAN 61-G

Increase Reliability and Reduce Maintenance Costs

- Precise flow channeling technology controls the flow seen within the tank, minimizing erosion potential and promoting turbulence
- Full acceptance bladders eliminate the risk of a bladder rupture
- Eliminate tank corrosion by isolating water from tank

eLink® Taco Connectivity

Taco Tags use the power of NFC technology to provide users with all the relevant documents for a specific product, right on their phone. Your digital document library will always be accessible with the most up to date documentation and product information for that specific piece of equipment.

Utilizing the power of Taco Tags to provide you with all of your documentation needs, Taco is ensuring our user base is informed to take control of their equipment.

eLink® Taco Connectivity

What do you have access to?

- Product Specifications
- CAD/REVIT Files
- Submittal Sheets
- Repair Parts Info
- Order Information
- Technical Support
- Taco Rep Information
- Catalog Sheets

EXAMPLE 1

Problem:

Select a Flow-Through full acceptance bladder style expansion tank for a potable water installation. The mechanical room and expansion tank are located on the lower level. Reliability and maintenance costs are a consideration. Copper system piping.

Conditions:

System Volume = 650 gallons

Minimum temperature = 40˚F

Maximum temperature = 140˚F

Minimum System Pressure at Tank Inlet = 40psi

Relief valve = 90psig

Calculation Key

V_t = Required Tank Volume
V_s = System Volume
v_1 = Specific Volume of Fluid @ lowest temp. ft3/lb
v_2 = Specific Volume of Fluid @ highest temp. ft3/lb
α = Linear Expansion Coefficient of piping
P_1 = Pressure at lowest temp
P_2 = Pressure at Highest temp
Δt = Temperature Differential

Sizing of a Captive Air Expansion Tank

$$V_t = V_s \frac{[(v_2/ v_1) - 1] - 3\alpha\Delta t}{1 - (P_a/ P_2)}$$

v_1 = .016019 ft^3/lb (40˚F)

v_2 = .016293 ft^3/lb (140˚F)

α = 9.5x 10^{-6}in/in ˚F for copper

Δt = 100˚F

P_1 = 40 psig + 14.7 psia = 54.7 psia

P_2 = 90psig + 14.7psia = 104.7 psia

Calculation of Net System Expansion —

Net System Expansion

$= V_s \{[(v_2/ v_1)-1] - 3\ \alpha\ \Delta t\}$

$= 650\ \{[(.016293/.016019)\ -1] - 3\ (9.5x10^{-6})\ 100\}$

$= 650\ \{.014255\}$

= 9.27 gallons

Calculate required tank volume –

$$V_t = V_s \frac{[(v_2/ v_1) - 1] - 3\alpha\Delta t}{1 - (P_1/ P_2)}$$

$V_t = 650\ \{[(.016293/.016109)\ -1] -3\ (9.5x10^{-6})\ 60\}/\ (1 - 54.4/104.7)$

= 19.2 gallons

For a system where reliability and maintenance are important select tank with full acceptance. Captive Air bladder tank model CAF90. The bladder on this tank is unaffected by overpressure conditions in the system and is more reliable. Acceptance volume of the tank is 23 gallons and the volume of the tank is 23 gallons.

Part 1 GENERAL

1.1 SECTION INCLUDES

A. Expansion tanks

1.2 RELATED SECTIONS

A. Section - Hydronic Piping.

1.3 REFERENCES

A. ASME (BPV VIII, 1) - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; The American Society of Mechanical Engineers; 2021.

1.4 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description, model and dimensions.

C. Certificates: Inspection certificates for pressure vessels from authority having jurisdiction.

D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

E. Project Record Documents: Record actual locations of flow controls.

F. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum five years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept equipment on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping components from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.7 MAINTENANCE SERVICE

A. Contractor to furnish service and maintenance for one year from date of substantial completion.

1.8 EXTRA MATERIALS

A. See Section 01400 - Project Requirements, for additional provisions.

Part 2 PRODUCTS

2.1 ASME Full Bladder TYPE EXPANSION TANKS

A. Manufactures:

1. Taco, Inc; Model CAF _____: www.taco-hvac.com
2. ITT Bell & Gossett
3. Amtrol Inc
4. Substitutions: See Section 01600 - Product Requirements.

B. Construction: Welded steel, designed, tested and stamped in accordance with ASME (BPV code sec VIII, div 1); supplied with National Board Form U-1, rated for working pressure of 150 psi , with flexible heavy duty butyl rubber bladder. Bladder shall be able to accept the full volume of the expansion tank and shall be removable and replaceable. System connection shall feature 2 port stainless design with precise flow channeling to ensure proper flow within vessel.

C. Accessories: Pressure gauge (field installed in adjacent piping by others) and air-charging fitting; precharge to _____ psi.

D. Automatic Cold Water Fill Assembly (field installed by others): Pressure reducing valve, reduced pressure double check back flow preventer, test cocks, strainer, vacuum breaker, and valved by-pass.

E. Size:

1. HW Tank Capacity: _____., _____ acceptance volume.
2. CW Tank Capacity: _____., _____ acceptance volume.

F. Hot Water Heating System:

1. Select expansion tank pressure relief valve at _____ psi maximum.
2. Set pressure reducing valve at _____ psi.

Part 3 EXECUTION

3.1 INSTALLATION

A. Install specialties in accordance with manufacturer's instructions.

B. Where large air quantities can accumulate, provide enlarged air collection standpipes.

C. Provide manual air vents at system high points and as indicated.

D. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.

E. Air separator and expansion tank to be installed on the suction side of the system pumps. Expansion tank to be tied into system piping in close proximity to air separator and system fill line.

F. Provide valved drain and hose connection on strainer blow down connection.

G. Provide relief valves on pressure tanks, low pressure side of reducing valves, heat exchangers, and expansion tanks.

H. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.

I. Pipe relief valve outlet to nearest floor drain.

J. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.

NOTES

A Taco Family Company

Taco Inc., 1160 Cranston Street, Cranston, RI 02920 / (401) 942-8000 / Fax (401) 942-2360
Taco (Canada) Ltd., 8450 Lawson Road, Unit #3, Milton, Ontario L9T 0J8 / (905) 564-9422 / Fax (905) 564-9436