Nicholson steam traps are manufactured by Spence Engineering.
It is the philosophy of Nicholson Steam Trap that, to win and be deserving of the trust of our customers, we must be ever mindful of and totally dedicated to quality; in all that we do; at every level of our operation.

ISO 9001
Certificate Number: 33694
Send in your Designer’s Guide Registration Card to receive
• Product Updates and
• New Product information

Life is all about choice.

Give someone you know a chance to choose from our wide variety of Quality Products. Give them a Catalog Request Card today!

Register online at www.nicholsonsteamtrap.com
Nicholson Steam Trap was founded in 1883 by W. H. Nicholson, Sr. He, along with his sons William, George and Samuel produced a variety of steam specialty products at their facility in Wilkes-Barre, Pennsylvania. Trap manufacturing was begun early in the twentieth century with the precursor to our current weight operated series traps. In the 1930's, a wide range of bellows-activated thermostatic traps were developed, the descendants of which are still built today in a modern facility at Walden, New York which manufactures a wide range of products from safety valves to control valves and, of course, steam traps.

The Nicholson Steam Trap product line is focused on the industrial marketplace and features traps ranging from highly polished stainless steel sanitary traps to innovative free float F&T traps. Nicholson thermostatic traps are known throughout the industry for their value and durability. Equally respected in naval yards are Nicholson orifice traps, offering long life and easy maintenance. A recent product introduction is the Condensate Commander Pump; a steam powered pump available in several sizes including prefabricated skid mounted systems. These continue the Nicholson tradition of providing high performance, value-oriented products to the industrial marketplace.

Nicholson Steam Trap, located in Walden, New York, has been producing a full line of steam specialties including steam traps, condensate pumps, sanitary steam traps, air traps and drain orifice unions since 1883. Nicholson Steam Trap is a Division of Spence Engineering Company, Inc.

For more information on Nicholson Steam Trap, visit our website at www.nicholsonsteamtrap.com or reach us via e-mail at sales@nicholsonsteamtrap.com
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NICHOLSON 845.778.5566 ● Fax: 845.778.7123 ● www.nicholsonsteamtrap.com
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THE NICHOLSON ADVANTAGE IS SERVICE

LOCAL TECHNICAL SUPPORT
Nicholson Steam Trap has a network of technically trained Representatives around the world. These Representatives can direct you to local inventory of our products for fast, fast service. They can also help you in the selection and sizing of Steam Traps, Air Traps, Condensate Pumps and other Steam Specialties.

TECHNICAL TRAINING
We offer a regular schedule of workshops covering various technical issues in our state of the art Valve Technology Training Center. We can also schedule customized training sessions to suit your particular needs.

ENGINEERING SEMINARS. These seminars provide the engineer with the skills of steam trap selection and sizing.

DISTRIBUTOR SEMINARS. This seminar will provide you with all the information you need to serve your customers.

MAINTENANCE SEMINARS. Maintenance personnel will receive hands-on training in selection, installation, operation, maintenance and troubleshooting.

NICHOLSON GUARANTEE
Nicholson Steam Trap warrants that the products we manufacture will be free from any defects in material or workmanship for a period of one year (or longer, when specified in product literature) from receipt by purchaser.

INTERNATIONAL SALES
Nicholson is well equipped to provide product to our customers around the world. We regularly ship our products to all parts of the world. Our experienced international sales group can meet the transport and documentation requirements of our international customers with ease. Our network of International Technical Sales Representatives will also be able to provide you with product from local inventory.

CANADIAN SALES
Nicholson maintains a technical sales representative network throughout the Canadian provinces. Nicholson products are registered with Canadian federal and provincial authorities. Canadian Registration Numbers are available. Please consult factory for a particular product CRN.
**How to Use this Handbook**

If you already know the product that you want information on, find the product page in the Table of Contents. Detailed product information on materials, ratings, dimensions, weights and applications are found in the Products Sections. General application and design information is in the Primer Section.

If you are not sure of what you need, collect all the following information. You will need it to select the right product for your needs.

- **Service** (i.e.: Steam, Compressed Air, Water, etc.)
- **Inlet Pressure**
- **Flow Rate** (or Capacities)
- **Outlet or Condensate Return Pressure**
- **Application** (i.e.: Condensate Removal, Pump, Pipe Couplings, etc.)

Application data is listed on all Product Pages. If you identify the nature of the installation, it will assist you selecting the proper equipment.

**What Kind of Trap is Needed?**

Bucket? F&T? Disc? Steam Pump? First the objective must be defined - then a trap must be chosen. If pumping is required then a condensate commander must be selected. Once the requirements for condensate removal have been defined, the primer section may be consulted to best match product characteristics to the application at hand. Following the primer section the trap selection guide should help refine the search. For those who possess a basic understanding of traps and the Nicholson product line, starting with the trap selection guide may be appropriate.

Once the application parameters have been defined (e.g. condensate removal from a 70 psi steam system, drip leg application, continuous duty, 180 lb/hr condensate flow) and a design of trap decided upon (e.g. thermostatic, carbon or stainless steel construction, 200 psi minimum operating pressure, integral strainer) the product section should be consulted to determine the range of traps available. Often several traps may meet the need. General preferences such as repairable design versus sealed, maintenance free designs, size and piping configuration, and cost are a few considerations that will help select a specific type trap.

**Economical, Long Life, or Best Suited for the Application**

Unfortunately, the best trap for an application may not necessarily be the least expensive or have the longest life span. Typically, other considerations such as ease of maintenance, initial cost, piping considerations, etc. may influence trap selection. The product section will list all pertinent specifications including overall length and features that may influence trap selection.

**How to Find Nicholson Traps**

Nicholson Steam Traps are manufactured and stored in Walden, New York, a village located in the lower Hudson Valley about 60 miles north of New York City. Nicholson goes to market through Manufacturers’ Representatives and Stocking distributors across the country. To find the nearest stocking location, contact the Nicholson factory at 845-778-5566 or visit our web site at www.nicholsonsteamtrap.com.
STEAM TRAP SELECTION

Types of Steam Traps

<table>
<thead>
<tr>
<th>Type</th>
<th>Thermostatic</th>
<th>Mechanical</th>
<th>Thermodynamic</th>
<th>Orifice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condensate Discharge</td>
<td>Bellows</td>
<td>Bimetal</td>
<td>F &amp; T</td>
<td>Bucket</td>
</tr>
<tr>
<td>Intermittent</td>
<td></td>
<td></td>
<td></td>
<td>Intermittent</td>
</tr>
</tbody>
</table>

- The optimum application of a trap is dependent upon the characteristics of the process and equipment with which it is used and its pattern of condensate discharge.
- The discharge capacity of a trap is determined by the pressure differential (trap inlet pressure minus outlet pressure) and the size of the orifice. Thermodynamic and Thermostatic traps (radiator and temperature modulating) have a fixed orifice size.
- Mechanical traps differ from the other types in that their orifice (discharge opening) must be selected to accommodate the maximum operating differential pressure.

Caution Failure to select the proper orifice may result in insufficient discharge capacity, waterlogging or locking of the trap.

Selecting a Steam Trap

It is important to select a product with the optimum capacity from the many types which are available. Use the following procedure to make sure the correct product is selected.

1. **Application**
   - Define the application and the type of service in which it will be used.
   
   The conditions under which a trap must operate will differ according to where it is installed.

2. **Confirmation of Operating Conditions**
   - Check the maximum operating pressure, temperature, discharge rate and other conditions.
   
   Do not oversize the trap. Select the smallest capacity trap, yet avoid undersizing and ensure safe, accurate operation given the conditions of inlet pressure, temperature and pressure differential under which it will operate.

3. **Maintenance Preference**
   - Confirm whether inline repair feature or maintenance free technology is desirable.

Steam Trap Application Guide

Check List for Confirming Operating Conditions

Discharge Rate Tables for Each Model

Specification Tables for Each Model
CHECK LIST FOR CONFIRMING OPERATING CONDITIONS

(A) Confirmation of Conditions

1. What is the application?
2. Which trap is appropriate for the application? *1
3. What is the trap inlet pressure? *2
4. What is the outlet pressure? *2
5. What is the condensate load?

<table>
<thead>
<tr>
<th>Discharge</th>
<th>Product name</th>
<th>Pressure differential</th>
<th>Required discharge capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>psig</td>
<td>lb/Hr</td>
</tr>
</tbody>
</table>

(B) Selection

1. The required discharge capacity of the trap is ___ times*3 the amount of condensate generated.
2. Inlet pressure - Outlet pressure = Pressure differential.
3. Select a trap with a maximum operating pressure equal to or slightly above the inlet pressure to the trap.
4. Select a discharge rate for the pressure differential from the discharge capacity chart.

<table>
<thead>
<tr>
<th>Discharge</th>
<th>Product name</th>
<th>Pressure differential</th>
<th>Required discharge capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>psig</td>
<td>lb/Hr</td>
</tr>
</tbody>
</table>

5. The trap with the smallest discharge capacity greater than that required is the optimum trap.
6. Connection size
7. Connection Type
   - Screwed
   - Flanged (flange standard_____)  
   - Socketweld

*1. See tables for selection of a steam trap by application.
*2. If unknown, is condensate recovered? Yes  No... (back pressure = 0 psig)

   If condensate is recovered
   ① How many feet does the trap outlet rise? __________ ft.  x 0.5 = __________ psig
   ② What is the total pipe length from the trap to the recovery tank? __________ ft.  x 0.01 = __________ psig
   ③ What is the pressure of the condensate recovery tank? __________ psig

   ④ Add ①, ② and ③ ....... {This is the outlet pressure (back pressure).} ① + ② + ③ = __________ psig

*3. Safety Factor
   The margin of safety which is determined by the operating characteristics of each piece of equipment is referred to as the “safety factor.” The safety factor required will differ according to the type of trap (type of condensate discharge). The discharge rate table for each model shows the values for condensate discharge when the trap is fully open, and the maximum rated condensate load on the equipment should correspond to the value obtained by dividing this discharge rate by the safety factor (see Steam Trap Application Guide on opposite page).
**STEAM TRAP APPLICATION GUIDE**

This guide is designed to direct the user to a General Steam Trap Technology section. Once a technology is selected, additional details, regarding specific steam traps, can be found in the catalog under the Technology Selection tab.

These choices, in the Guide, are based on many years of steam trap manufacturing experience. The choices, however, are not limited to these alone. Variations in individual systems (superheat, water hammer, insulation, etc.), as well as personal preference, should be taken into consideration.

<table>
<thead>
<tr>
<th>Application</th>
<th>Thermodynamic</th>
<th>Thermostatic</th>
<th>Free Float</th>
<th>Inverted Bucket</th>
<th>Float &amp; Thermostatic</th>
<th>O rifice</th>
<th>Minimum Safety Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drip &amp; Tracing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Drip to 30 PSIG</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1.5:1</td>
</tr>
<tr>
<td>to 300 PSIG</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1.5:1</td>
</tr>
<tr>
<td>to 650 PSIG</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1.5:1</td>
</tr>
<tr>
<td>to 2500 PSIG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1.5:1</td>
</tr>
<tr>
<td>Steam Tracing</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1.5:1</td>
</tr>
</tbody>
</table>

| **Process**              |               |              |            |                 |                      |         |                       |
| Heat Exchanger to 20 PSIG| 2             | 1            | 1          | 2               | 1                    | 2:1     | 2:1                   |
| to 150 PSIG              | 1             | 1            | 1          | 2               | 1                    | 2:1     | 2:1                   |
| to 300 PSIG              |               |              |            |                 |                      | 2:1     | 2:1                   |
| to 600 PSIG              |               |              |            |                 |                      | 2:1     | 2:1                   |
| Cooker/Reactor to 15 PSIG| 2             | 1            | 1          | 3               | 1                    | 3:1     | 3:1                   |
| to 60 PSIG               | 1             | 1            | 1          | 3               | 1                    | 3:1     | 3:1                   |
| to 150 PSIG              | 1             | 1            | 1          | 3               | 1                    | 3:1     | 3:1                   |
| to 600 PSIG              | 2             | 1            | 1          | 3               | 1                    | 3:1     | 3:1                   |
| Pressing to 100 PSIG     | 1             | 2            | 1          | 2               | 1                    | 3:1     | 3:1                   |
| to 300 PSIG              | 1             | 2            | 2          | 2               | 1                    | 3:1     | 3:1                   |
| Reboiler                 | 2             | 1            | 3          | 1               |                      | 2:1     |                       |
| Rotating Cylinders       | 2*            | 1*           | 2          |                 | 3                    | 3:1     |                       |
| Sterilizer               | 1             | 2            | 2          |                 |                      | 2:1     |                       |
| Tank Heating Storage     | 1             | 2            | 2          |                 |                      | 2:1     |                       |
| Line Heater              | 1             | 2            | 2          |                 |                      | 1.5:1   |                       |
| Evaporator               | 1             | 2            | 2          |                 |                      | 2:1     |                       |

| HVAC                     |               |              |            |                 |                      |         |                       |
| Air Heating Coils to 15 PSIG | 2             | 1            | 3          | 1               |                      | 2:1     |                       |
| to 60 PSIG               | 2             | 1            | 2          | 1               |                      | 2:1     |                       |
| to 250 PSIG              | 2             | 1            | 2          | 1               |                      | 2:1     |                       |
| Radiator                 | 1             |              |            |                 |                      | 4       | 2:1                   |
| Unit Heater              | 1             | 1            | 2          | 1               |                      | 2:1     |                       |
| Absorption Chiller       | 2             | 1            | 2          | 1               |                      | 2:1     |                       |

*Requires Steam Lock Release

**KEY**

Blank = not recommended

1 = First Choice  3 = Third Choice
2 = Second Choice  4 = Fourth Choice
# Steam Trap Selection Criteria Matrix

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>Thermostatic</th>
<th>Thermodynamic</th>
<th>Mechanical</th>
<th>Orifice</th>
<th>Free Float</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Response to</td>
<td>Load Changes</td>
<td>F &amp; T</td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>Slow</td>
<td>Fast</td>
<td>Moderate</td>
<td>Very Slow</td>
</tr>
<tr>
<td></td>
<td>Air Venting</td>
<td>High</td>
<td>Low</td>
<td>Med/High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Thermal Efficiency</td>
<td>High</td>
<td>Medium</td>
<td>Med/High</td>
<td>High†</td>
</tr>
<tr>
<td></td>
<td>Applications</td>
<td>Drip Legs</td>
<td>Drip Legs</td>
<td>Drip Legs</td>
<td>Drip Legs</td>
</tr>
<tr>
<td></td>
<td>Affected By Ambient Temperatures</td>
<td>No (unless insulated)</td>
<td>No (susceptible to freezing)</td>
<td>No</td>
<td>No (may freeze)</td>
</tr>
<tr>
<td></td>
<td>Relative Cost</td>
<td>Low</td>
<td>Low</td>
<td>Med/Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Capacity</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Pressure Range</td>
<td>to 650 psi</td>
<td>10 to 600 psi</td>
<td>to 650 psi</td>
<td>to 250 psi</td>
</tr>
<tr>
<td></td>
<td>Size vs. Capacity</td>
<td>Small</td>
<td>Medium</td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td>Life Expectancy</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Long</td>
</tr>
<tr>
<td></td>
<td>Ease of Maintenance</td>
<td>Very Easy</td>
<td>Very Easy</td>
<td>Moderate</td>
<td>Very Easy</td>
</tr>
<tr>
<td></td>
<td>Orientation Limits</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

† Within narrow load range.

## Nicholson Steam Trap Options

### Steam Lock Release (SLR) Orifice
Specify where immediate elimination of condensate and improved sensitivity is desired. This option may also improve performance in applications where condensate must be lifted upstream from the trap. Allows continuous discharge of condensate. Trap will nominally pass 50 lb/hr of condensate at 50 psi within 2°F of saturated temperature.

### Skirted Seat Trim
Recommended for higher pressure service, often over 300 psi. Minimizes erosion by dispersing trap discharge.

### Sterilizer Trim
Specify where immediate elimination of condensate and improved sensitivity is desired. Shorter seat opens more quickly in presence of condensate. Hotter discharge temperature.

### Internal Strainer
Recommended where steam may be contaminated with pipe scale or other particulate matter. Screen reduces deposits on valve and seat.

### Blowdown Valve
Specify to clean strainer area and remove debris trapped before strainer. Also used to determine whether steam or water is present before the steam trap.

### ISO Filled Actuator
Specify to reduce flash steam, provide highest thermal efficiency and/or air vent operation is desired. This option will subcool condensate by approximately 40°F. For use in applications above 500 psig and/or for superheated steam.

### Welded Actuator
Specify where long service life and/or fail open operation is desired.

### Continuous Bleed Air Vent
Replaces thermostatic air vent with a 1/32 inch orifice.
LIQUIDATOR 450 Series
Thermostatic Steam Trap
Pressures To 450 PSIG
Temperatures to 600°F

Applications
- Unit Heaters
- Steam Tracing
- Drip Legs
- Tire Presses
- Air Vents
- Laundry Equipment
- Plating Tanks
- Platen Presses
- Cooking Equipment

Easily Maintained
Four bolt cover permits easy in-line rebuilding for less than the cost of replacement.

Excellent Energy Savings
Positive shutoff and thermostatic action assure no loss of steam during normal operation.

Fits all Universal Connectors
Liquidator body will replace any manufacturers’ universal mount trap body.

Easily Replaced
Two bolt design permits rapid removal without breaking pipe connections.

Freeze Proof
Self draining when installed vertically.

Optional Integral Strainer
Helps prevent dirt and scale build-up on valve seat.

Durability and Long Service Life
Stainless steel body and cover with stainless steel welded actuator for maximum corrosion, thermal and hydraulic shock resistance.

Rapid Startup with Outstanding Air Handling
Thermostatic action responds quickly to eliminate air and other non-condensibles. Large startup capacity.

Water Tight Seal
Hardened stainless steel valve and seat lapped as a matched set assure tight seal and long life.

3 Year Guarantee
Guaranteed against defects in material and workmanship.
THERMOSTATIC
STEAM TRAPS

**NICHOLSON** is the originator of the bellows actuated Thermostatic Steam Trap. **NICHOLSON**’s thermostatic product range spans applications from critical tracing to high capacity process. High sensitivity, immediate air venting and exceptional thermal efficiency are the hallmark of **NICHOLSON** Thermostatic Steam Traps.
Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. On start-up, valve is normally open. When steam enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow. As condensate collects, it takes heat from thermal actuator, lowering internal pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load. Restricted orifice in N125L (small opening at bottom of valve seat) prevents trap from discharging continuously on light loads.
N125 SERIES THERMOSTATIC STEAM TRAPS

SPECIFICATION

Steam trap shall be of balanced pressure design with stainless steel welded actuator capable of discharging condensate within 10°F of saturated temperature. Where greater sensitivity is required, SLR orifice and Sterilizer trim will be available to allow condensate evacuation at or near saturated temperatures. Where subcooling of condensate is desired alternate thermostatic actuator will be available to allow condensate evacuation at or near 40°F below saturated temperatures. Thermostatic actuator shall employ a conical valve lapped in matched sets with the seat ring assuring tight shut off. A minimum of three orifice sizes shall be available allowing for custom capacity sizing. Trap shall be bronze bodied suitable for pressures through 125 psig and available in 3/8” through 3/4” NPT connections.

MAXIMUM OPERATING CONDITIONS

PMO: Max. Operating Pressure 125 psig (8.75 barg)
TMO: Max. Operating Temperature 400°F (204°C)
PMA: Max. Allowable Pressure 125 psig (8.75 barg)
TMA: Max. Allowable Temperature 400°F (204°F)

MATERIALS OF CONSTRUCTION

Body & Cover ………………………… ASTM B283 C37700
Actuator……………………………Welded Stainless Steel
Cover Gasket ……………………………Copper Jacketed
Valve & Seat ………………Hardened 416 Stainless Steel

Maximum Capacity—lbs/hr 10°F Below Saturation (Kg/hr 5°C Below Saturation)

<table>
<thead>
<tr>
<th>Trap</th>
<th>Orifice Inch (mm)</th>
<th>5 (0.34)</th>
<th>10 (0.7)</th>
<th>20 (1.4)</th>
<th>50 (3.5)</th>
<th>100 (6.9)</th>
<th>125 (8.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N125L</td>
<td>1/8 (3)</td>
<td>216 (98)</td>
<td>265 (120)</td>
<td>375 (170)</td>
<td>592 (269)</td>
<td>778 (354)</td>
<td>838 (383)</td>
</tr>
<tr>
<td>N125</td>
<td>1/4 (6)</td>
<td>550 (249)</td>
<td>825 (374)</td>
<td>1210 (549)</td>
<td>1975 (896)</td>
<td>2825 (1281)</td>
<td>3140 (1424)</td>
</tr>
<tr>
<td>N125ST</td>
<td>5/16 (8)</td>
<td>860 (390)</td>
<td>1220 (554)</td>
<td>1725 (783)</td>
<td>2725 (1237)</td>
<td>3575 (1623)</td>
<td>3850 (1748)</td>
</tr>
</tbody>
</table>

Nicholson recommends ISO filled Actuator for superheated steam.
N450 SERIES
THERMOSTATIC
STEAM TRAPS

Pressures to 450 PSIG (31 barg)
Temperatures to 600°F (316°C)

COMPACT — Easy to install.
INEXPENSIVE — Low initial cost.
IMPROVED ENERGY SAVINGS — High efficiency—maximum elimination of air and non-condensibles.
TEMPERATURE SENSITIVE ACTUATORS — One moving part. Stainless Steel, fail open, welded actuator for maximum corrosion, thermal and hydraulic shock resistance.
HARDENED STAINLESS STEEL VALVE AND SEAT — Long life. Lapped as a matched set for water tight seal.
EASILY MAINTAINED — Can be inspected and serviced without breaking pipe connections.
FREEZE PROOF — Self draining when installed vertically.
FOR SUPERHEATED STEAM APPLICATIONS — Because the trap closes at saturated steam temperature, superheated steam cannot reach trap.
AIR VENT — Efficient steam service air vent when equipped with ISO filled Actuator and installed in air vent location.
GUARANTEED — Guaranteed against defects in materials or workmanship for 3 years.
POSITIVE SHUTOFF AND LONG LIFE — Integral Stainless Steel Strainer helps prevent debris depositing on valve and seat.

APPLICATIONS
- Unit Heaters
- Air Vents
- Steam Tracing
- Drip Legs
- Platen Presses
- Plating Tanks
- Sterilizers
- Tire Presses
- Cooking Equipment
- Laundry Equipment
- Other Process Equipment

OPTIONS
- SK - Skirted Seat*
- SLR - SLR Orifice
- ISO - ISO Filled Actuator*
- S - Internal SS Strainer (std. on N451)
- ST - Sterilizer Trim
- SW - Socketweld

*Not available on N451

Canadian Registration # 0E0591.9

OPERATION
Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. On start-up, valve is normally open. When steam enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow. As condensate collects, it takes heat from thermal actuator, lowering internal pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load. Restricted orifice in the N451 seat (small opening at bottom of valve seat) prevents trap from discharging continuously on light loads such as are encountered on tracer lines.
N450 SERIES THERMOSTATIC STEAM TRAPS

SPECIFICATIONS

Steam trap shall be of balanced pressure design with stainless steel welded actuator capable of discharging condensate within $10^\circ$F of saturated temperature. Where greater sensitivity is required, SLR orifice and Sterilizer trim will be available to allow condensate evacuation at or near saturated temperatures. Where subcooling of condensate is desired alternate thermostatic actuator will be available to allow condensate evacuation at or near $40^\circ$F below saturated temperatures. Thermostatic actuator shall employ a conical valve lapped in matched sets with the seat ring assuring tight shut off. A minimum of three orifice sizes shall be available allowing for custom capacity sizing. Trap shall be forged carbon steel bodied suitable for pressures through 450 psig and available in 1/2" and 3/4" NPT or socket weld.

MAXIMUM OPERATING CONDITIONS

PMO: Max. Operating Pressure† 450 psig (31 barg)
TMO: Max. Operating Temperature 600°F (316°C)
PMA: Max. Allowable Pressure 450 psig (31 barg)
TMA: Max. Allowable Temperature 750°F (399°C)
† Consult factory for pressures greater than 300 psi.

MATERIALS OF CONSTRUCTION

Body .................. ASTM A105 Forged Steel
Cover .................. ASTM A351 Grade CF8 (304)
Cover Gasket ....... 304 SS Spiral Wound w/Graphite Fill
Actuator .............. Welded Stainless Steel
Strainer ............... 033 Perf. 304 Stainless Steel
Valve & Seat .......... Hardened 416 Stainless Steel

Maximum Capacity—lbs/hr $10^\circ$F Below Saturation (Kg/hr $5^\circ$C Below Saturation)

<table>
<thead>
<tr>
<th>Trap</th>
<th>Orifice</th>
<th>Inch (mm)</th>
<th>5 (0.34)</th>
<th>10 (0.7)</th>
<th>20 (1.4)</th>
<th>50 (3.4)</th>
<th>100 (6.7)</th>
<th>125 (8.4)</th>
<th>150 (10.1)</th>
<th>200 (13.4)</th>
<th>250 (16.8)</th>
<th>300 (20.1)</th>
<th>350 (24.1)</th>
<th>400 (27.6)</th>
<th>450 (31.0)</th>
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</thead>
<tbody>
<tr>
<td>N451</td>
<td>5/64 (2)</td>
<td>84 (38)</td>
<td>119 (54)</td>
<td>168 (76)</td>
<td>265 (120)</td>
<td>348 (158)</td>
<td>375 (170)</td>
<td>398 (181)</td>
<td>439 (199)</td>
<td>472 (214)</td>
<td>502 (228)</td>
<td>529 (240)</td>
<td>553 (251)</td>
<td>575 (261)</td>
<td></td>
</tr>
<tr>
<td>N452</td>
<td>1/8 (3)</td>
<td>216 (98)</td>
<td>265 (120)</td>
<td>375 (170)</td>
<td>592 (269)</td>
<td>778 (354)</td>
<td>838 (381)</td>
<td>890 (405)</td>
<td>980 (445)</td>
<td>1055 (480)</td>
<td>1121 (510)</td>
<td>1180 (536)</td>
<td>1235 (561)</td>
<td>1284 (584)</td>
<td></td>
</tr>
<tr>
<td>N453</td>
<td>1/4 (6)</td>
<td>550 (249)</td>
<td>825 (374)</td>
<td>1210 (549)</td>
<td>1975 (906)</td>
<td>2825 (1281)</td>
<td>3140 (1424)</td>
<td>3425 (1554)</td>
<td>3650 (1656)</td>
<td>3960 (1796)</td>
<td>4100 (1860)</td>
<td>4230 (1919)</td>
<td>4420 (2005)</td>
<td>4600 (2086)</td>
<td></td>
</tr>
<tr>
<td>N454</td>
<td>5/16 (8)</td>
<td>860 (390)</td>
<td>1220 (554)</td>
<td>1725 (783)</td>
<td>2725 (1237)</td>
<td>3575 (1623)</td>
<td>3850 (1748)</td>
<td>4090 (1857)</td>
<td>4505 (2045)</td>
<td>4850 (2202)</td>
<td>5155 (2340)</td>
<td>5425 (2463)</td>
<td>5675 (2576)</td>
<td>5900 (2679)</td>
<td></td>
</tr>
</tbody>
</table>

LIQUIDATOR 450 SERIES
UNIVERSAL MOUNT THERMOSTATIC STEAM TRAPS

Pressures to 450 PSIG (31 barg)
Temperatures to 600°F (316°C)

**Easily Maintained** — Universal two bolt swivel mounting simplifies removal from system. Kits allow flexibility to replace or rebuild.

**Simple Installation** — Stainless mounting block mounts permanently into system. Trap installs via two bolt universal connection.

**Improved Energy Savings** — High efficiency—maximum elimination of air and non-condensibles.

**Temperature Sensitive Actuators** — One moving part. Stainless Steel, fail open, welded actuator for maximum corrosion, thermal and hydraulic shock resistance.

**Hardened Stainless Steel Valve and Seat** — Long life. Lapped as a matched set for water tight seal.

**Easily Maintained** — Can be inspected and serviced without breaking pipe connections.

**Freeze Proof** — Self draining when installed vertically.

**For Superheated Steam Applications** — Because the trap closes at saturated steam temperature, superheated steam cannot reach trap.

**Air Vent** — Efficient steam service air vent when equipped with ISO filled Actuator and installed in air vent location.

**Guaranteed** — Traps are guaranteed against defects in materials or workmanship for three years.

**Positive Shutoff and Long Life** — Integral Stainless Steel Strainer helps prevent debris depositing on valve and seat.

**MODELS**

- **UMT-TD10L**—Low Capacity Trap
- **UMT-TD10**—Standard Capacity Trap
- **UMTC**—Standard connector (1/2" & 3/4" only)
- **UMTCY-RH**—Right Hand Connector w/Y strainer*
- **UMTCY-LH**—Left Hand Connector w/Y strainer*
- **UMTVS-BB**—Connector with Isolation Valves, Strainer, Blowdown Valve and Test Port

For complete unit, order trap and connector as separate items.

*Add (-B) for Blowdown Valve.

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**APPLICATIONS**
- Unit Heaters
- Steam Tracing
- Drip Legs
- Tire Presses
- Cooking Equipment
- Laundry Equipment
- Plating Tanks
- Platen Presses
- Air Vents

**OPTIONS**
- **SLR - SLR Orifice***
- **ISO - ISO Filled Actuator***
- **SW - Socketweld**
- **B - Blowdown Valve**

*Not available on UMT451T

Canadian Registration # OE1388.6

For information on Big Block UMTVS-BB Connector
SEE PAGE 116

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**OPERATING PRINCIPLE**

Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. On start-up, valve is normally open. When steam enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow. As condensate collects, it takes heat from thermal actuator, lowering internal pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load. Restricted orifice in UMT451T (small opening at bottom of valve seat) prevents trap from discharging continuously on light loads such as are encountered on tracer lines.
LIQUIDATOR
450 SERIES
UNIVERSAL MOUNT
THERMOSTATIC
STEAM TRAPS

SPECIFICATIONS
Steam trap shall be of balanced pressure design with stainless steel welded actuator capable of discharging condensate within 10°F of saturated temperature. Where greater sensitivity is required, SLR orifice and Sterilizer trim will be available to allow condensate evacuation at or near saturated temperatures. Where subcooling of condensate is desired alternate thermostatic actuator will be available to allow condensate evacuation at or near 40°F below saturated temperatures. Thermostatic actuator shall employ a conical valve lapped in matched sets with the seat ring assuring tight shut off. A minimum of two orifice sizes shall be available allowing for custom capacity sizing. Trap shall be stainless steel bodied suitable for pressures through 450 psig. Trap connection shall be two bolt universal swivel mount. Mounting block shall be stainless steel and available in 1/2" through 1" NPT or socket weld.

MAXIMUM OPERATING CONDITIONS
Traps with Welded Stainless Actuator
PMO: Max. Operating Pressure 450 psig (31 barg)
TMO: Max. Operating Temperature 600°F (316°C)
Traps with Welded Stainless Actuator, ISO
PMO: Max. Operating Pressure 450 psig (31 barg)
TMO: Max. Operating Temperature 600°F (316°C)
All Traps
PMA: Max. Allowable Pressure 450 psig (31 barg)
TMA: Max. Allowable Temperature 750°F (399°C)

MATERIALS OF CONSTRUCTION
Body & Cover ..................ASTM A351 Grade CF8 (304)
Cover Gasket......................304 stainless spiral wound w/graphite fill
Actuator ........................................................Welded SS
Strainer .............................033 perf. 304 Stainless Steel
Valve & Seat ....................Hardened 416 Stainless Steel
Mounting Block ................ASTM A351 Grade CF8 (304)

LIQUIDATOR
450 SERIES
UNIVERSAL MOUNT
THERMOSTATIC
STEAM TRAPS

Maximum Capacity—lbs/hr 10°F Below Saturation (Kg/hr 5°C Below Saturation)

| Trap   | Orifice Diameter (Inch) | 5  (0.34) | 10 (0.7) | 20 (1.4) | 50 (3.4) | 100 (6.7) | 125 (8.4) | 150 (10.1) | 200 (13.4) | 250 (16.8) | 300 (20.1) | 350 (24.1) | 400 (27.6) | 450 (31.0) |
|--------|-------------------------|-----------|----------|----------|----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|
| UMT451T| 5/64 (2)                | 84 (38)   | 119 (54) | 168 (76) | 265 (120)| 348 (158) | 375 (170) | 398 (181)  | 439 (199)  | 472 (214)  | 502 (228)  | 529 (240)  | 553 (251)  | 575 (261)  |
| UMT452T| 1/8 (6)                 | 216 (98)  | 265 (120)| 375 (170)| 592 (269)| 778 (354) | 838 (381) | 890 (405)  | 980 (445)  | 1055 (480)| 1121 (510)| 1180 (536) | 1235 (561)| 1284 (584) |
| UMT453T| 1/4 (6)                 | 550 (249) | 825 (374)| 1210 (549)| 1975 (896)| 2825 (1281)| 3140 (1424)| 3425 (1554)| 3650 (1656)| 3960 (1796)| 4100 (1860)| 4230 (1919)| 4420 (2005)| 4600 (2086)|

ISO filled Actuator recommended for superheated steam.
Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. As assembled, valve is normally open. When very hot condensate enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow. As condensate collects, it takes heat from the actuator, lowering internal pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load. Restricted orifice in TA502 (small opening at bottom of valve seat) prevents trap from discharging continuously on light loads such as are encountered on tracer lines.

**Applications**
- Unit Heaters
- Air Vents
- Steam Tracing
- Drip Legs
- Platen Presses
- Plating Tanks
- Sterilizers
- Tire Presses
- Cooking Equipment
- Laundry Equipment
- Other Process Equipment

**Options**
- ISO - ISO Filled Actuator
- SLR - SLR Orifice
- SW - Socketweld

Canadian Registration # 0E0591.9

**Operation**

**Sealed Stainless Steel Body** — Lightweight, compact and corrosion resistant. No bolts or gaskets. Eliminates body leaks.

**Self Centering Valve** — Leak tight shutoff. Improved energy savings. Assembly of actuator and valve to impingement plate allows valve to self-align with center of valve seat orifice. Provides long lasting valve and seat.

**Temperature Sensitive Actuators** — One moving part. Stainless Steel, fail open or fail closed, welded actuator for maximum corrosion, thermal and hydraulic shock resistance.

**For Superheated Steam Applications** — Because the trap closes at saturated steam temperature, superheated steam cannot reach trap.

**Thermal and Hydraulic Shock Resistant** — Impingement plate plus welded construction prevent damage to actuator.

**Hardened Stainless Steel Valve and Seat** — Long life. Lapped as a matched set for water tight seal.

**Inexpensive** — Low initial cost.

**Maintenance Free** — Sealed unit. Replacement traps cost less than repair of more expensive in-line repairable traps.

**Freeze Proof** — Self draining when installed vertically.

**Directional Discharge** — Pipe thread erosion prevented by directing discharge to center of pipe.

**Air Vent** — Efficient steam service air vent when equipped with ISO Bellows and installed in air vent location.

**Guaranteed** — Guaranteed against defects in materials or workmanship for 3 years.

**MODELS***
- TA502 - Reduced capacity
- TA503 - Standard capacity
- TA504 - High capacity

*Add (-FC) for fail closed or (-FO) for fail open to end of model number

**APPLICATIONS**
- Unit Heaters
- Air Vents
- Steam Tracing
- Drip Legs
- Platen Presses
- Plating Tanks
- Sterilizers
- Tire Presses
- Cooking Equipment
- Laundry Equipment
- Other Process Equipment

**OPTIONS**
- ISO - ISO Filled Actuator
- SLR - SLR Orifice
- SW - Socketweld

Canadian Registration # 0E0591.9

**OPERATION**

Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. As assembled, valve is normally open. When very hot condensate enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow. As condensate collects, it takes heat from the actuator, lowering internal pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load. Restricted orifice in TA502 (small opening at bottom of valve seat) prevents trap from discharging continuously on light loads such as are encountered on tracer lines.
Steam trap shall be of balanced pressure design with stainless steel welded actuator capable of discharging condensate within 10°F of saturated temperature. Where greater sensitivity is required or protection from flash steam locking, a SLR orifice shall be available to allow condensate and flash steam evacuation at or near saturated temperatures. Where subcooling of condensate is desired alternate thermostatic actuator will be available to allow condensate evacuation at or near 40°F below saturated temperatures. Thermostatic actuator shall employ a conical valve lapped in matched sets with the seat ring assuring tight shut off. A minimum of three orifice sizes shall be available allowing for custom capacity sizing. Trap shall be stainless steel bodied suitable for pressures to 650 psig and available in 3/8” through 1” NPT or socketweld.

**MAXIMUM OPERATING CONDITIONS**

Standard Traps  
PMO: Max. Operating Pressure 500 psig (34.5 barg)  
TMO: Max. Operating Temperature 600°F (316°C)

ISO Option Traps  
PMO: Max. Operating Pressure 650 psig (44.8 barg)  
TMO: Max. Operating Temperature 650°F (343°C)

All Traps  
PMA: Max. Allowable Pressure 650 psig (44.8 barg)  
TMA: Max. Allowable Temperature 750°F (400°C)

**MATERIALS OF CONSTRUCTION**

Body & Cover ……………ASTM A351 Grade CF3M (316L)  
Actuator……………………………Welded Stainless Steel  
Valve & Sea ………………Hardened 416 Stainless Steel

**Dimensions**

<table>
<thead>
<tr>
<th>NPT or Socket weld</th>
<th>inches (mm)</th>
<th>Weight Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>3/8, 1/2&quot;</td>
<td>3/4 (95)</td>
<td>13/4 (44)</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>3/2 (100)</td>
<td>13/4 (44)</td>
</tr>
<tr>
<td>1&quot;</td>
<td>43/8 (111)</td>
<td>13/4 (44)</td>
</tr>
</tbody>
</table>

**Maximum Capacity**—lbs/hr 10°F Below Saturation (Kg/hr 5°C Below Saturation)

<table>
<thead>
<tr>
<th>Trap</th>
<th>Orifice Inch (mm)</th>
<th>Differential PSIG (barg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 (0.34)</td>
<td>10 (0.7)</td>
</tr>
<tr>
<td>TA502</td>
<td>1/8 (3)</td>
<td>216 (98)</td>
</tr>
<tr>
<td>TA503</td>
<td>1/4 (6)</td>
<td>550 (249)</td>
</tr>
<tr>
<td>TA504</td>
<td>5/16 (8)</td>
<td>860 (390)</td>
</tr>
</tbody>
</table>

* Nicholson recommends ISO filled Actuator above 500 psi (34.5 bar) and for superheated steam.
Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. On start-up, valve is normally open. When steam enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow. As condensate collects, it takes heat from thermal actuator, lowering internal pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load. Optional blowdown valve allows fast and easy cleaning of internal strainer without removing trap from operation.
N650 SERIES THERMOSTATIC STEAM TRAPS

SPECIFICATION

Steam trap shall be of balanced pressure design with stainless steel welded actuator capable of discharging condensate within 10°F of saturated temperature. Where greater sensitivity is required or protection from flash steam locking, a SLR orifice will be available to allow condensate and flash steam evacuation at or near saturated temperatures. Where subcooling of condensate is desired alternate thermostatic actuator will be available to allow condensate evacuation at or near 40°F below saturated temperatures. Thermostatic actuator shall employ a conical valve lapped in matched sets with the seat ring assuring tight shut off. A minimum of four orifice sizes shall be available allowing for custom capacity sizing. Trap shall be forged carbon steel Y pattern body with strainer and available blow down valve suitable for pressures to 650 psig and available in 1/2" and 3/4" NPT or socketweld.

MAXIMUM OPERATING CONDITIONS

Standard Traps
PMO: Max. Operating Pressure 500 psig (34.5 barg)
TMO: Max. Operating Temperature 600°F (316°C)

ISO Option Traps
PMO: Max. Operating Pressure 650 psig (44.8 barg)
TMO: Max. Operating Temperature 650°F (343°C)

All Traps
PMA: Max. Allowable Pressure 650 psig (44.8 barg)
TMA: Max. Allowable Temperature 750°F (400°C)

MATERIALS OF CONSTRUCTION

Body & Cover ……………………ASTM A105 Forged Steel
Actuator……………………………Welded Stainless Steel
Cover Gasket ……304 SS Spiral Wound w/Graphite Fill
Strainer …………………….033 Perf. 304 Stainless Steel
Blowdown Valve ………………………416 Stainless Steel
Valve & Seat ………………Hardened 416 Stainless Steel

Maximum Capacity—lbs/hr 10°F Below Saturation (Kg/hr 5°C Below Saturation)

| Trap   | Orifice | Inch (mm) | 5 (0.34) | 10 (0.57) | 20 (1.27) | 50 (3.5) | 100 (6.9) | 125 (8.62) | 150 (10.3) | 200 (13.8) | 250 (17.2) | 300 (20.7) | 350 (24.1) | 400 (27.6) | 450 (31.0) | 500 (34.5) | 550 (37.9) | 600 (41.4) | 650 (44.8) |
|--------|---------|-----------|----------|-----------|-----------|----------|----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| N651   | 5/64 (2)| 84 (38)   | 119 (54) | 168 (76)  | 265 (120)| 348 (158)| 375 (170)| 398 (181)  | 439 (199)  | 472 (214)  | 502 (228)  | 529 (240)  | 553 (251)  | 575 (261)  | 595 (270)  | 615 (280)  | 635 (289)  | 650 (295)  |
| N652   | 1/8 (3) | 216 (98)  | 265 (120)| 375 (170)| 592 (269)| 778 (354)| 838 (381)| 890 (405)  | 980 (445)  | 1055 (480)| 1121 (510)| 1180 (536)| 1235 (561)| 1284 (584)| 1331 (604)| 1377 (625)| 1425 (646)| 1471 (667)|
| N653   | 1/4 (6) | 550 (249)| 825 (374)| 1210 (549)| 1975 (896)| 2825 (1281)| 3140 (1424)| 3425 (1554)| 3650 (1656)| 3960 (1796)| 4100 (1860)| 4230 (1919)| 4420 (2005)| 4600 (2086)| 4760 (2161)| 4910 (2232)| 5060 (2297)| 5190 (2359)|
| N654   | 5/16 (8)| 860 (390)| 1220 (554)| 1725 (783)| 2725 (1237)| 3755 (1623)| 3850 (1748)| 4090 (1857)| 4505 (2045)| 4850 (2202)| 5155 (2340)| 5425 (2463)| 5675 (2576)| 5900 (2679)| 6110 (2774)| 6310 (2868)| 6480 (2945)| 6625 (3011)|

Nicholson recommends ISO filled Actuator above 500 psi (34.5 bar) and for superheated steam.
Nicholson recommends skirted seat above 300 psi (20.7 bar).
Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. On start-up, valve is normally open. When steam enters trap, thermal actuator fills vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow. As condensate collects, it takes heat from thermal actuator, lowering internal pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load.
Steam trap shall be of balanced pressure design with stainless steel welded actuator capable of discharging condensate within 10°F of saturated temperature. Where greater sensitivity is required, SLR orifice and Sterilizer trim shall be available to allow condensate evacuation at or near saturated temperatures. Thermostatic actuator shall employ a conical valve lapped in matched sets with the seat ring assuring tight shut off. A minimum of two orifice sizes shall be available allowing for custom capacity sizing. Trap shall be bronze bodied suitable for pressures through 200 psig and available in 1/2” through 1” NPT connections.

**Maximum Operating Conditions**

PMO: Max. Operating Pressure 200 psig (13.8 barg)
TMO: Max. Operating Temperature 400°F (204°C)

PMA: Max. Allowable Pressure 200 psig (13.8 barg)
TMA: Max. Allowable Temperature 400°F (204°C)

**Materials of Construction**

Body & Cover ………………………ASTM B283 C37700
Actuator……………………………Welded Stainless Steel
Cover Gasket ……………………………Copper Jacketed
Valve & Seat ………………Hardened 416 Stainless Steel

### Dimensions

<table>
<thead>
<tr>
<th>Trap</th>
<th>Pipe Size inches</th>
<th>Inch (mm)</th>
<th>Weight lb (kg)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>A33 1/2</td>
<td>2 (41)</td>
<td>1/8</td>
<td>4 (76)</td>
</tr>
<tr>
<td>A43 3/4</td>
<td>2 (47)</td>
<td>1/8</td>
<td>4 (76)</td>
</tr>
<tr>
<td>A53 1</td>
<td>2 1/2 (56)</td>
<td>2 1/2 (125)</td>
<td>4 (76)</td>
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<tr>
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<td>3/8 (98)</td>
<td>3 (76)</td>
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<tr>
<td>AHV43 3/4</td>
<td>4 1/2 (22)</td>
<td>3/8 (108)</td>
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<td>AHV53 1</td>
<td>5 1/2 (25)</td>
<td>1 1/2 (116)</td>
<td>4 (76)</td>
</tr>
</tbody>
</table>

### Maximum Capacity—lbs/hr 10°F Below Saturation (Kg/hr 5°C Below Saturation)

| Trap     | Orifice inch | 1 (0.07) | 2 (0.14) | 5 (0.34) | 10 (0.69) | 15 (1.03) | 20 (1.4) | 25 (1.6) | 30 (1.8) | 40 (2.8) | 50 (3.4) | 60 (4.1) | 80 (5.5) | 100 (6.9) | 125 (8.6) | 150 (10.3) | 175 (12.1) | 200 (13.8) |
|----------|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1/2" A33, AHV33 | 5/16 (8) | 785 (357) | 1050 (477) | 1650 (750) | 2325 (1057) | 2575 (1170) | 2825 (1284) | 3295 (1498) | 3815 (1734) | 4200 (1909) | 4675 (2125) | 5035 (2289) | 535 (2516) | 5720 (2600) | 6085 (2766) | 6210 (2823) |
| 3/4" A43, AHV43 | 3/8 (10) | 985 (448) | 1390 (632) | 2180 (991) | 3255 (1395) | 3735 (1689) | 4225 (1920) | 5040 (2291) | 5480 (2491) | 5990 (2723) | 6645 (3020) | 7135 (3325) | 7315 (3463) | 7560 (3657) | 8045 (3727) |
| 1" A53, AHV53  | 3/8 (10) | 1050 (405) | 1390 (632) | 2180 (991) | 3255 (1395) | 3735 (1689) | 4225 (1920) | 5040 (2291) | 5480 (2491) | 5990 (2723) | 6645 (3020) | 7135 (3325) | 7315 (3463) | 7560 (3657) | 8045 (3727) |
| 1/2"-1” All High Capacity “HC” | 1/2 (13) | 1140 (518) | 1610 (732) | 2545 (1157) | 3600 (1636) | 4405 (2002) | 5090 (2314) | 7195 (3270) | 8045 (3657) | 8810 (4005) | 9800 (4455) | 10560 (4800) | 11375 (5170) | 12090 (5495) | 12725 (5784) | 13305 (6048) |
**BELIEVER “B” SERIES THERMOSTATIC STEAM TRAPS**

Pressures To 250 PSIG (17.2 barg)
Temperatures to 450°F (232°C)

**Freeze Proof** — When installed on side with cover perpendicular to ground.

**Renewable In-line** — Renew trap in-line with factory packaged precision matched internal parts, replacement kits.

**Compact** — Requires minimum space while providing condensate capacities equal to larger mechanical traps.

**Superior Performance** — Maximum air handling capability. Immediate response to changing pressure and condensate loads. No adjustment necessary.

**Sensitivity** — Increased when installed on side with cover perpendicular to ground.

**Temperature Sensitive Actuators** — One moving part, stainless steel, fail open or closed, welded actuator provides maximum corrosion, thermal and hydraulic shock resistance and sensitivity.

**Guaranteed** — Guaranteed against defects in materials or workmanship for 3 years.

**MODELS**

- **B33** - 1/2" straight thru trap
- **B43** - 3/4" straight thru trap
- **B53** - 1" straight thru trap
- **B63** - 1-1/4" straight thru trap
- **B73** - 1-1/2" straight thru trap
- **B83** - 2" straight thru trap

*Add (-HC) to end of model number for high capacity.

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**APPLICATIONS**

- Unit Heaters
- Pipe Coils
- Blast Coils
- Steam Mains
- Dry Kilns
- Jacketed Kettles
- Hot Water Heaters
- Dryers (all types)
- Large Heat Exchangers

**OPTIONS**

- SLR - SLR Orifice
- HC - High capacity orifice

Canadian Registration # 0E0591.9

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**OPERATION**

Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. On start-up, valve is normally open. When steam enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow.

As condensate collects, it takes heat from thermal actuator, lowering internal pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load.
**BELIEVER “B” SERIES THERMOSTATIC STEAM TRAPS**

**SPECIFICATION**

Steam trap shall be of balanced pressure design with stainless steel welded actuator capable of discharging condensate within 10°F of saturated temperature. Where greater sensitivity is required or protection from flash steam locking, a SLR orifice will be available to allow condensate and flash steam evacuation at or near saturated temperatures. Thermostatic actuator shall employ a conical valve lapped in matched sets with the seat ring assuring tight shut off. Trap shall be cast iron or cast steel bodied suitable for pressures to 250 psig and available in 1/2” through 2” NPT.

**MAXIMUM OPERATING CONDITIONS**

PMO: Max. Operating Pressure 250 psig (17.2 barg)
TMO: Max. Operating Temperature 450°F (232°C)
PMA: Max. Allowable Pressure 250 psig (17.2 barg)
TMA: Max. Allowable Temperature 450°F (232°C)

**MATERIALS OF CONSTRUCTION**

Body & Cover: .................Cast Iron ASTM A278 Class 30
Actuator: .......................Welded Stainless Steel
Cover Gasket: ........................Graphite
Valve & Seat: .....................Hardened 416 Stainless Steel

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### Dimensions

<table>
<thead>
<tr>
<th>Trap</th>
<th>Pipe Size Inches</th>
<th>A (Inch)</th>
<th>B (Inch)</th>
<th>C (Inch)</th>
<th>D (Inch)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B33</td>
<td>1/2</td>
<td>3/8 (98)</td>
<td>1/4 (29)</td>
<td>5/16 (149)</td>
<td>4/16 (114)</td>
<td>3.2</td>
</tr>
<tr>
<td>B43</td>
<td>3/4</td>
<td>4/16 (108)</td>
<td>1/2 (35)</td>
<td>6/16 (171)</td>
<td>5/16 (129)</td>
<td>4.7</td>
</tr>
<tr>
<td>B53</td>
<td>1</td>
<td>5/16 (140)</td>
<td>1/2 (48)</td>
<td>7/32 (195)</td>
<td>5/32 (148)</td>
<td>7.1</td>
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<tr>
<td>B63</td>
<td>1 1/4</td>
<td>5/16 (140)</td>
<td>1/2 (48)</td>
<td>7/32 (195)</td>
<td>5/32 (148)</td>
<td>15.6</td>
</tr>
<tr>
<td>B73</td>
<td>1 1/2</td>
<td>7/32 (184)</td>
<td>1/2 (33)</td>
<td>9/32 (230)</td>
<td>7/32 (197)</td>
<td>15.3</td>
</tr>
<tr>
<td>B83</td>
<td>2</td>
<td>7/32 (184)</td>
<td>1/2 (33)</td>
<td>9/32 (230)</td>
<td>7/32 (197)</td>
<td>32.4</td>
</tr>
</tbody>
</table>

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### Maximum Capacity—Lbs/hr 10°F Below Saturation (Kg/hr 5°C Below Saturation)

| Trap   | Pipe Size Inch | Orifice | 1 (0.07) | 2 (0.14) | 5 (0.34) | 10 (0.7) | 20 (1.4) | 50 (3.5) | 100 (6.9) | 125 (8.6) | 150 (10.3) | 175 (12.1) | 200 (13.8) | 225 (15.5) | 250 (17.2) |
|--------|----------------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| B33    | 3/8 (911)      | 985 (448) | 1390 (632) | 2180 (991) | 3070 (1395) | 3735 (1698) | 5040 (2291) | 6645 (3070) | 7315 (3325) | 7560 (3436) | 8045 (3657) | 8200 (3727) | 8615 (3916) | 8915 (4052) |
| B43    | 4/16 (108)     | 1460 (664) | 2055 (934) | 3240 (1473) | 4560 (2073) | 5550 (2523) | 7480 (3400) | 9865 (4484) | 10850 (4932) | 11225 (5102) | 11935 (5425) | 12165 (5530) | 12770 (5805) | 13225 (6011) |
| B53, B63 | 1/2 (12)      | 1825 (830) | 2575 (1170) | 4050 (1841) | 5700 (2591) | 6925 (3148) | 9350 (4750) | 12340 (5609) | 13565 (6166) | 14030 (6377) | 14920 (6782) | 15230 (6923) | 15960 (7255) | 16540 (7518) |
| B73, B83 | 3/4 (19)      | 1460 (664) | 2055 (934) | 3240 (1473) | 4560 (2073) | 5550 (2523) | 7480 (3400) | 9865 (4484) | 10850 (4932) | 11225 (5102) | 11935 (5425) | 12165 (5530) | 12770 (5805) | 13225 (6011) |
| B73HC, B83HC | 1 1/4 (32) | 3555 (1616) | 5030 (2286) | 7950 (3614) | 11240 (5109) | 15900 (7227) | 21540 (9147) | 33000 (15000) | 3555 (1616) | 5030 (2286) | 7950 (3614) | 11240 (5109) | 15900 (7227) | 21540 (9147) | 33000 (15000) |

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**Connections:** 1/2"-2" NPT
CONQUEROR “C” SERIES THERMOSTATIC STEAM TRAPS

Pressures To 300 PSIG (21 barg)
Temperatures to 500°F (260°C)

**Freeze Proof** — When installed with horizontal inlet and vertical outlet.

**Renewable In-line** — Renew trap in-line with factory packaged precision matched internal parts, replacement kits.

**Compact** — Requires minimum space while providing condensate capacities equal to larger mechanical traps.

**Superior Performance** — Maximum air handling capability. Immediate response to changing pressure and condensate loads. No adjustment necessary.

**Sensitivity** — Increased when installed on side with cover perpendicular to ground.

**Temperature Sensitive Actuators** — One moving part, stainless steel, fail open or closed, welded actuator provides maximum sensitivity, corrosion and thermal & hydraulic shock resistance.

**Guaranteed** — Guaranteed against defects in materials or workmanship for 3 years.

**Models**
- **C33**—1/2” angle pattern trap
- **C43**—3/4” angle pattern trap
- **C53**—1” angle pattern trap
- **C63**—1-1/4” angle pattern trap
- **C73**—1-1/2” angle pattern trap
- **C83**—2” angle pattern trap

CS models are the same as above in cast steel.

*Add (-HC) to end of model number for high capacity.

**APPLICATIONS**
- Unit Heaters
- Pipe Coils
- Blast Coils
- Steam Mains
- Dry Kilns
- Jacketed Kettles
- Hot Water Heaters
- Dryers (all types)
- Large Heat Exchangers

**OPTIONS**
- **SLR** - SLR Orifice
- **SW** - Socketweld
- **HC** - High capacity orifice

Canadian Registration # 0E0591.9

**OPERATION**

Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. On start-up, valve is normally open. When steam enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow.

As condensate collects, it takes heat from thermal actuator, lowering internal pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load.
CONQUEROR “C” SERIES THERMOSTATIC STEAM TRAPS

**SPECIFICATION**

Steam trap shall be of balanced pressure design with stainless steel, welded actuator capable of discharging condensate within 10°F of saturated temperature. Where greater sensitivity is required or protection from flash steam locking, a SLR orifice shall be available to allow condensate and flash steam evacuation at or near saturated temperatures. Thermostatic actuator shall employ a conical valve lapped in matched sets with the seat ring assuring tight shut off. Trap shall be cast iron or cast steel bodied suitable for pressures to 250 psig and available in 1/2” through 2” NPT.

**MAXIMUM OPERATING CONDITIONS**

<table>
<thead>
<tr>
<th>Trap</th>
<th>PMO: Max. Operating Pressure</th>
<th>TMO: Max. Operating Temperature</th>
<th>PMA: Max. Allowable Pressure</th>
<th>TMA: Max. Allowable Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type C</td>
<td>250 psig (17.2 barg)</td>
<td>450°F (232°C)</td>
<td>250 psig (17.2 barg)</td>
<td>450°F (232°C)</td>
</tr>
<tr>
<td>Type CS</td>
<td>300 psig (20.7 barg)</td>
<td>500°F (260°C)</td>
<td>300 psig (20.7 barg)</td>
<td>500°F (260°C)</td>
</tr>
</tbody>
</table>

**MATERIALS OF CONSTRUCTION**

Body & Cover: Type C … Cast Iron ASTM A278 Class 30 WCB
Type CS Cast Steel ASTM A216 Grade WCB
Actuator: ……………. Welded Stainless Steel
Cover Gasket: …………………………………… Graphite
Valve & Seat: …………… Hardened 416 Stainless Steel

**Dimensions**

<table>
<thead>
<tr>
<th>Trap</th>
<th>Pipe Size inches</th>
<th>Orifice (Inches)</th>
<th>A (in)</th>
<th>B (in)</th>
<th>C (in)</th>
<th>D (in)</th>
<th>Weight lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C33, CS33</td>
<td>1/2</td>
<td>3/8 to 9/16</td>
<td>985 (448)</td>
<td>1390 (632)</td>
<td>2180 (991)</td>
<td>3070 (1395)</td>
<td>3735 (1698)</td>
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<td>C43, CS43</td>
<td>3/4</td>
<td>5/32 to 1/2</td>
<td>1460 (664)</td>
<td>2055 (934)</td>
<td>3240 (1473)</td>
<td>4560 (2073)</td>
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<td>5/8 to 1 1/4</td>
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<td>C63, CS63</td>
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<td>5030 (2286)</td>
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<td>11240 (5109)</td>
<td>15900 (7227)</td>
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<td>C73HC, C83HC</td>
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<td>1 1/4 to 1 1/2</td>
<td>3555 (1616)</td>
<td>5030 (2286)</td>
<td>7950 (3614)</td>
<td>11240 (5109)</td>
<td>15900 (7227)</td>
</tr>
</tbody>
</table>

**Maximum Capacity**—lbs/hr 10°F Below Saturation (Kg/hr 5°C Below Saturation)

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Nicholson Steam Trap

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