

NICHOLSON STEAM TRAP

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

NICHOLSON **STEAM TRAP**

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TABLE OF CONTENTS

The Nicholson Advantage is Service	4
How to Use this Handbook	5
Steam Trap Selection	6
Types of Steam Traps	6
Selecting a Steam Trap	6
Checklist for Confirming Operating Conditions	7
Steam Trap Application Guide	8
Steam Trap Selection Criteria Matrix	9
Nicholson Steam Trap Options	9

THERMOSTATIC STEAM TRAPS

<i>Liquidator 450 Series Thermostatic Steam Trap Features</i>	10
N125 Series Thermostatic Steam Traps	12
N450 Series Thermostatic Steam Traps	14
Liquidator 450 Series Universal Mount Thermostatic Steam Traps	16
TA Series Thermostatic Steam Traps	18
N650 Series Thermostatic Steam Traps	20
Achiever "A" Series Thermostatic Steam Traps	22
Believer "B" Series Thermostatic Steam Traps	24
Conqueror "C" Series Thermostatic Steam Traps	26

MECHANICAL STEAM TRAPS

<i>Nova NFT250 Series Variable Orifice Steam Traps Features</i>	30
<i>Dura-Flo Inverted Bucket Steam Trap Features</i>	31
Nova NFT250 Series Variable Orifice Steam Traps	32
Nova NFT650 Series Variable Orifice Steam Traps	34
FTN Series Float & Thermostatic Steam Traps	36
Max-Flo Super High Capacity Float & Thermostatic Steam Traps	38
FTE Series Float & Thermostatic Steam Traps	40
Dura-Flo Inverted Bucket Steam Traps	44
Dura-Flo Inverted Bucket Steam Traps PCA Repair Kits	47
FTN Series Float & Thermostatic Steam Traps Repair Kits	47
Sealed SS Dura-Flo Inverted Bucket Steam Traps	48
Repairable SS Dura-Flo Inverted Bucket Steam Traps	50

THERMODYNAMIC STEAM TRAPS

<i>Liquidator UMT-TD Series Thermodynamic Steam Trap Features</i>	52
NTD600 Series Thermodynamic Steam Traps	54
S610 Series Thermodynamic Steam Trap	56
S650 Series Thermo-active Steam Trap	58
Liquidator UMT-TD Universal Mount Thermodynamic Steam Traps	60

ORIFICE STEAM TRAPS

Type DFA Drain Orifice Steam Trap	64
Type DUA Orifice Union Assembly	66

CLEAN STEAM PRODUCTS

CDS Sanitary Thermostatic Steam Traps	70
CDH Sanitary Thermostatic Steam Traps	72
DS100/DS110 Thermostatic Steam Traps	74
DS200 Series Thermostatic Steam Traps	76
Sanitizer NTD 230L Series Sanitary Thermodynamic Steam Traps	78
Steam Scrubber Stainless Steel Filter	80
Type D50 Stainless Steel Steam Pressure Reducing Valve	82

CONDENSATE RECOVERY

<i>Condensate Commander Pump Features</i>	84
Condensate Commander Pump	86
Condensate Commander Classic Pump	87
Condensate Commander Big Boy Pump	88
Condensate Commander Horizontal Pump	89
Condensate Commander Little Boy Pump	90
Condensate Commander Pump Capacity Table	91
Condensate Commander Pump Skid Mounted System	92
Condensate Commander Pump Primer	94
Condensate Commander Pump Checklist	95
Condensate Commander Pump Selection Guidelines	96
Condensate Commander Pump Installations	97

UNIFLEX COUPLINGS AND GENERAL USE VALVES

<i>Uniflex Carbon/Stainless Steel Pipe Couplings Features</i>	100
Uniflex Carbon/Stainless Pipe Couplings	102
Type D Pressure Reducing Valve	104

AIR TRAPS/LIQUID DRAINERS

Drain-Air & Mini-Drains	108
TAV Series Thermostatic Air Vent	110
Eliminator Series Steam Separator	112

PIPING SPECIALTIES

<i>Big Block UMT Valve Station Features</i>	114
Big Block Universal Mount Trap Valve Station	116
STV Series Combination Trap Test & Blocking Steam Valve	118
SS600 Series Noise Diffuser	120
Pneumatic Mufflers	122

STEAM TRAPPING PRIMER

Thermostatic Steam Traps	127
Mechanical Steam Traps	127
Thermodynamic Steam Traps	129
Orifice Steam Traps	129
Sizing Steam Traps	130
Sizing Condensate Return Lines	136
Steam Tracing Design Guidelines	137
Clean Steam Design Guidelines	138
Piping & Trapping Design Guidelines	138
Sizing Eliminator Steam Separators	139

TABLE OF CONTENTS

TECHNICAL REFERENCE

Steam Tables.....	142
Pressure to Vacuum.....	144
Properties of Water.....	144
Condensation Warm-up Loads.....	145
Condensation Loads.....	145
Conversion Tables.....	146
Pipe Data Tables.....	147

APPLICATION DRAWINGS

Oven Heating Coils.....	152
Drip Leg/End of Main Leg.....	153
Shell & Tube Heat Exchanger.....	154
Vessel with Steam Coil Outlet at Top.....	155
Unit Heater.....	156
Flat Work Ironer.....	157
Steam Press.....	158
Jacketed Pressure Vessel.....	159
Pressure Vessel with Dimple Jacket.....	160
Flash Tank with Condensate Booster Pump.....	161
Multi-coil Air Handler.....	162
High Pressure Air Coil.....	163
Dry Can/Calender Roll.....	164
Jacketed Kettle.....	165
Tilting Jacketed Kettle.....	166
Domestic Hot Water.....	167
Glossary of Terms.....	168

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

Type	Thermostatic		Mechanical	Thermodynamic		Orifice
	Bellows	Bimetal	F & T	Bucket	Disc	Orifice
Condensate Discharge	Intermittent	Intermittent	Continuous	Intermittent	Intermittent	Continuous

- 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.



Steam Trap Application Guide

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.



Check List for Confirming Operating Conditions

Discharge Rate Tables for Each Model

3

Maintenance Preference

Confirm whether inline repair feature or maintenance free technology is desirable.



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?

	psig
	psig
	lb/Hr

(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.

Discharge	Product name	Pressure differential	Required discharge capacity
<input type="checkbox"/>		psig	lb/Hr
<input type="checkbox"/>			
<input type="checkbox"/>			

5. The trap with the smallest discharge capacity greater than that required is the optimum trap.
6. Connection size in
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?	<input type="text"/> ft.	x 0.5 =	<input type="text"/> psig
② What is the total pipe length from the trap to the recovery tank?	<input type="text"/> ft.	x 0.01 =	<input type="text"/> psig
③ What is the pressure of the condensate recovery tank?			<input type="text"/> psig
④ Add ①, ② and ③{This is the outlet pressure (back pressure).}	① + ② + ③ =		<input type="text"/> 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.

Application	Thermo-static	Thermo-dynamic	Free Float	Inverted Bucket	Float & Thermostatic	Orifice	Minimum Safety Factor
Drip & Tracing							
Main Drip to 30 PSIG	1		2	3	2	4	1.5:1
to 300 PSIG	1	2	3	2	3	3	1.5:1
to 650 PSIG	1	2			3	2	1.5:1
to 2500 PSIG						1	1.5:1
Steam Tracing	1	2	2	2	2	3	1.5:1
Process							
Heat Exchanger to 20 PSIG	2		1	2	1		2:1
to 150 PSIG	1		1	2	1		2:1
to 300 PSIG	1		1	2	1		2:1
to 600 PSIG			1				2:1
Cooker/Reactor to 15 PSIG	2		1	3	1		3:1
to 60 PSIG	1		1	3	1		3:1
to 150 PSIG	1		1	3	1		3:1
to 600 PSIG	2		1				3:1
Pressing to 100 PSIG	1		1	2	1		3:1
to 300 PSIG	1	2	2	2			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		1.5:1
Line Heater	1		2		2		3:1
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				3:1
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

FUNCTION	Thermostatic	Thermodynamic	Mechanical		Orifice	Free Float
			F & T	IB		
Response to Load Changes	Moderate	Slow	Fast	Moderate	Very Slow	Fast
Air Venting	High	Low	Med/High	Low	Low	High
Thermal Efficiency	High	Medium	Med/High	Medium	High†	Med/High
Applications	Drip Legs Tracing Process Eqpt.	Drip Legs Tracing	Drip Legs Process Eqpt.	Drip Legs Process Eqpt.	Drip Legs	Drip Legs Process Eqpt.
Affected By Ambient Temperatures	No (unless insulated)	Yes	No (susceptible to freezing)		No	No (may freeze)
Relative Cost	Low	Low	Medium	Med/Low	Low	Medium
Capacity	Medium	Low	High		Low	High
Pressure Range	to 650 psi	10 to 600 psi	to 650 psi	to 250 psi	to 2500 psi	to 650 psi
Size vs. Capacity	Small	Medium	Large		Small	Large
Life Expectancy	Moderate	Moderate	Moderate	Moderate	Long	Long
Ease of Maintenance	Very Easy	Very Easy	Moderate		Very Easy	Moderate
Orientation Limits	No	No	Yes		No	Yes

† 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.