

# VELAN

## Universal Bimetallic Steam Traps



Universal Steam Trap  
with Cage Unit



For Steam Power Plants  
and Marine Service



Float Bimetallic



Super Capacity  
Piston Operated



Piping Kings

**For Steam applications  
ranging up to:**

**1,100°F (593°C)**

**0-2,600 psi (179 bar)**

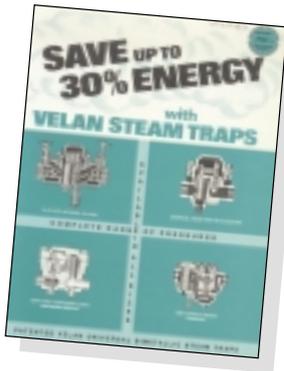
*Save up to 30% in Energy Extracting Part of the Sensible Heat*

# VELAN COMPANY PROFILE

Velan is one of the world's leading manufacturers of industrial valves, supplying forged and cast steel gate, globe, check, ball, butterfly, knife gate and engineered severe service valves for critical applications in power, chemical and petrochemical, oil and gas, pulp and paper, mining, marine, cryogenic and general construction industries.

Founded in 1950, Velan earned a reputation for excellence as a major supplier of forged valves to nuclear power plants and the U.S. Navy. Velan has pioneered many innovative valve designs, emphasizing quality, safety, ease of operation, low emissions, simple in-line maintenance and long cycle life.

Velan's 21 product lines are manufactured in 12 specialized manufacturing plants, including six in Canada and U.S.A., three in Europe, and three in Asia. We have 1,500 employees, 75% of whom are located in our North American operations.



## THE ORIGINAL VELAN STEAM TRAP

Velan is pleased to announce that we have reacquired the Velan universal steam trap line produced for 15 years by Plenty Steam Products. This comprehensive range of steam traps is based on a unique design that was developed and patented by A.K. Velan, President and CEO of Velan Inc., and is now copied by major steam trap manufacturers. Once again, you can trust Velan to supply high quality steam traps for virtually all of your condensate drainage applications.

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## HEAD OFFICE & PLANT 5



**MONTREAL, CANADA** 115,000 sq. ft. (10,683 m<sup>2</sup>)  
3-24" (80-600 mm) butterfly, 3/8-4" (10-100 mm) metal & resilient seated ball valves

## MANUFACTURING LOCATIONS

### CANADA

#### VELAN INC.

**HEAD OFFICE & PLANT 5**  
7007 Côte de Liesse  
Montreal, QC H4T 1G2  
Tel: (514) 748-7743  
Fax: (514) 748-8635

#### PLANT 1

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Montreal, QC H4M 1T6  
Tel: (514) 748-7743  
Fax: (514) 748-8635

#### PLANT 2 / 7

550 McArthur Ave.  
Montreal, QC H4T 1X8  
Tel: (514) 748-7743  
Fax: (514) 341-3032

#### PLANT 4 / 6

1010 Cowie Street  
Granby, QC J2J 1E7  
Tel: (450) 378-2305  
Fax: (450) 378-6865

#### PROQUIP

835 Fourth Line  
Oakville, ON L6L 5B8  
Tel: (905) 842-1721  
Fax: (905) 849-0923

### U.S.A.

#### VELAN VALVE CORPORATION

**PLANT 3**  
94 Avenue C  
Williston, VT 05495-9732  
Tel: (802) 863-2562  
Fax: (802) 862-4014

### ENGLAND

**VELAN VALVES LTD.**  
Unit 1, Pinfold Road  
Lakeside Business Park  
Thurmaston  
Leicester LE4 8AS  
Tel: 44-116 269-5172  
Fax: 44-116 269-3695

### FRANCE

#### VELAN S.A.S

90, rue Challemeil Lacour  
F 69 367 Lyon Cedex 7  
Tel: (33) 4 78 61 67 00  
Fax: (33) 4 78 72 12 18

### PORTUGAL

**VELAN VÁLVULAS INDUSTRIAIS, LDA.**  
Av. Ary dos Santos  
1679-018 Famosos  
Tel: (351-21) 934-7800  
Fax: (351-21) 934-7809

### TAIWAN

#### VELAN-VALVAC

P.O. Box 2020  
Taichung, Taiwan  
R.O.C.  
Tel: (04) 2792649  
Fax: (886) 42750855

### KOREA

**VELAN LTD.**  
1060-4 Shingil-Dong  
Ansan City,  
Kyunggi-do 425-833  
Tel: (82) 31-491-2811  
Fax: (82) 31-491-2813

## DISTRIBUTION CENTERS

### U.S.A.

#### VELCAL

537 Stone Road, Unit "A"  
Benicia, CA 94510  
Tel: (707) 745-4507  
Fax: (707) 745-4708

#### VELEAST

605 Commerce  
Park Drive SE  
Marietta, GA 30060  
Tel: (770) 420-2010  
Fax: (707) 420-7063

### GERMANY

#### VELAN GmbH

Daimlerstrasse 8  
D-47877 Willich  
Tel: (49) 2154/4938-00  
Fax: (49) 2154/4938-99

## GENERAL INFORMATION

**Tel: 44-116 269-5172**  
**Fax: 44-116 269-3695**  
[steamtraps@velan.com](mailto:steamtraps@velan.com)

Visit the Velan website at [www.velan.com](http://www.velan.com) for an updated contact list.  
Velan has sales offices and distributors located worldwide.

**NOTE:** The material in this catalog is for general information. For specific performance data and proper material selection, consult your Velan representative. Although every attempt has been made to ensure that the information contained in this catalog is correct, Velan reserves the right to change designs, materials or specifications without notice.

# MANUFACTURING PLANTS AROUND THE WORLD

**PLANT 1**



**MONTREAL, CANADA** 109,000 sq. ft. (10,126 m<sup>2</sup>) ¼–4" (8–100 mm) forged gate, globe & check valves, ASME 'N' stamp, ISO 9001

**PLANT 2 & 7**



**MONTREAL, CANADA** 170,000 sq. ft. (15,800 m<sup>2</sup>) 2–60" (50–1500 mm) forged and cast steel gate, globe, check, ball, knife and butterfly valves 26–36" (650–700 mm) ASME 'N' stamp, ISO 9001

**PLANT 4 & 6**



**GRANBY, CANADA** 186,500 sq. ft. (17,325 m<sup>2</sup>) 2–12" (50–300 mm) cast steel gate and check valves, ½–12" (8–300 mm) ball valves, ISO 9001



**TORONTO, CANADA Velan-Proquip** 41,000 sq. ft. (3,800 m<sup>2</sup>) 2–48" (50–1200 mm) wafer check valves ½–24" (15–600 mm) clamp joint connectors, ISO 9001



**WILlich, GERMANY** 12,000 sq. ft. (1,115 m<sup>2</sup>) ISO 9002



**LEICESTER, ENGLAND** 14,000 sq. ft. (1,300 m<sup>2</sup>) ISO 9002, steam traps, ¾–2" (10–50 mm) bonnetless globe valves ½–2" (15–50 mm)

**PLANT 3**



**WILLISTON, VERMONT, U.S.A.** 155,000 sq. ft. (14,400 m<sup>2</sup>) 2–24" (50–600 mm) forged and cast steel gate, globe and check valves, ASME 'N' stamp, ISO 9001



**LYON, FRANCE** 160,000 sq. ft. (14,900 m<sup>2</sup>) ¼–40" (8–1,000 mm) forged and cast steel gate, globe and butterfly valves, ISO 9001



**LISBON, PORTUGAL** 60,000 sq. ft. (5,600 m<sup>2</sup>) ISO 9002 2–12" (50–300 mm) cast steel gate, globe and check valves



**ANSAN CITY, SOUTH KOREA Plant 1** 30,000 sq. ft. (2,800 m<sup>2</sup>) components and 2–4" (50–100 mm) cast steel valves, ISO 9002



**ANSAN CITY, SOUTH KOREA Plant 2** 65,000 sq. ft. (5,800 m<sup>2</sup>) 6–12" (150–300 mm) cast steel gate, globe, check, ball and knife gate valves, ISO 9002



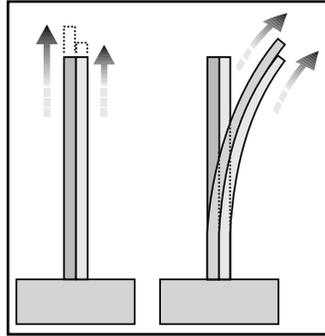
**TAICHUNG, TAIWAN Velan-Valvac** 20,000 sq. ft. (1,840 m<sup>2</sup>) ¼–2" (8–50 mm) ball valves, ISO 9002

# PRINCIPLES OF OPERATION

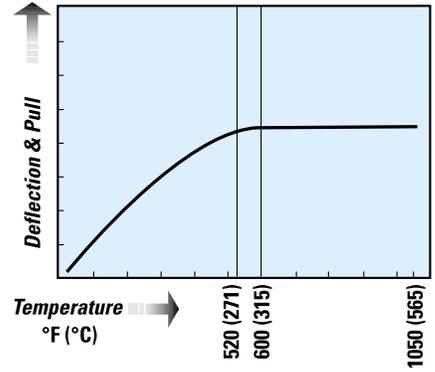
## The Original "Universal" Bimetal Principle Actuates Velan Steam Traps

### WHAT IS BIMETAL?

- Bimetal is a composite metal comprising two or more metallic layers with different coefficients of expansion, which changes curvature when subjected to heat.



Velan Steam Traps use a bimetal of high tensile strength, stable at high temperature with deflection limited to 600°F (315°C) to prevent over-stressing on super-heated steam service.



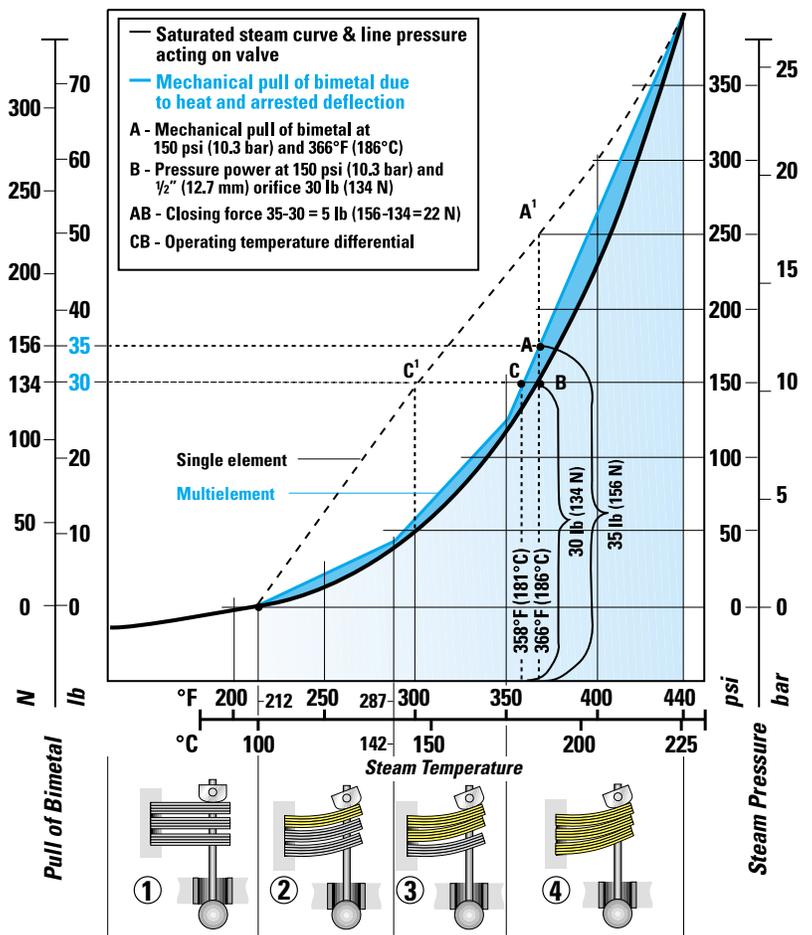
### THE CLOSING FORCE OF THE BIMETALLIC ELEMENTS FOLLOWS THE SATURATED STEAM CURVE

The force of line pressure acting on the valve ball holds it open when condensate or air is in the trap. Line pressure, valve and orifice diameter determine this force. For a 1/2" (12.7 mm) orifice at 150 psi (10.3 bar) line pressure develops a force of 30 lb (134 N). To close the valve on steam the bimetallic element must develop a pull of at least 35 lb (156 N) with three segments. The patented Velan multi-segment design was developed so that the thermal pull of the bimetal element would closely follow the saturated steam curve and use only the portion of the element required to overcome the opening force at saturated steam temperature.

A non-segmented bimetallic element would have a straight-line characteristic and the trap would only react to large temperature differentials, whereas the Velan segmented element automatically compensates for any pressure condition within its range, and maintains the sensitivity to release condensate at below steam temperature without loss of steam.

**Chart 1** illustrates the truly universal operating principle behind the Velan steam trap. Each segment acts consecutively, covering the complete operating pressure range without adjustment or orifice change. With a single element the temperature differential to open the steam trap would be BC<sup>1</sup> (66°F/37°C) instead of BA (8°F/4.4°C) and the required closing force would be BA<sup>1</sup> (20 lb/90 N) instead of BA (5 lb/22 N).

**Chart 1** Operating Principle of Velan Steam Traps



1. Free deflection up to 212°F (100°C)
2. One segment pulling 0-40 psi (0-2.8 bar) up to 287°F (142°C)
3. Two segments pulling 40-120 psi (2.28-8.3 bar) up to 350°F (177°C)
4. Three segments pulling 120-350 psi (8.3-24 bar) up to 440°F (227°C)

# PRINCIPLES OF OPERATION

## The Velan Patented Bimetal Principle as Applied to Meet Various Requirements

### UNIVERSAL STEAM TRAP PRINCIPLE

- **Chart 2** illustrates the bimetal closing force developed at saturated temperature in relation to the line pressure tending to open the valve. The gradual increase in force, following the steam curve, is a function of the patented segmentation principle of the element. The delicate balance of opening and closing forces exists in all pressure ranges such as 0-200, 0-350, 0-600, 0-1500, 500-2500 psi (0-14, 0-21, 0-41, 0-103, 35-172 bar), and produces complete universal operation throughout the pressure range without adjustment or orifice change. See page 4 for more details.

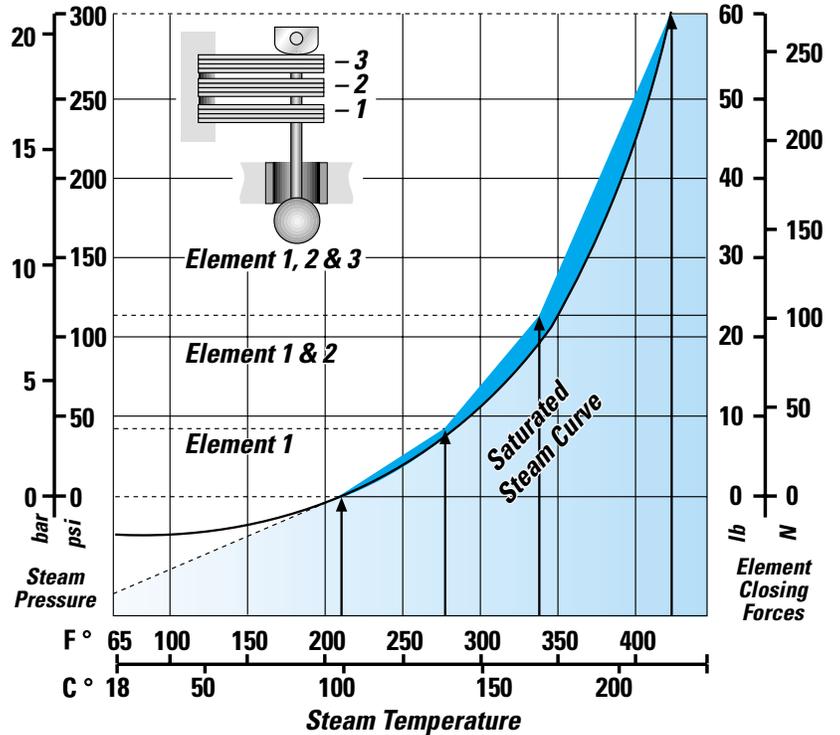


Chart 2 The patented Multi-element Principle.

### FLOAT BIMETALLIC PRINCIPLE

- **Chart 3** illustrates the operation of the combination of a bimetal and float element utilized in the float/bimetallic series. In this principle, the bimetal is used to close the valve at saturated temperature or release cool air in the system. However a small accumulation of condensate in the trap body lifts the float and opens the discharge valve. No temperature depression is required for this process and, as a result, the characteristic is identical to the saturated steam curve. The steam trap shuts off in the presence of steam and opens at once in the presence of condensate even at saturated steam temperature. See page 5 for more details.

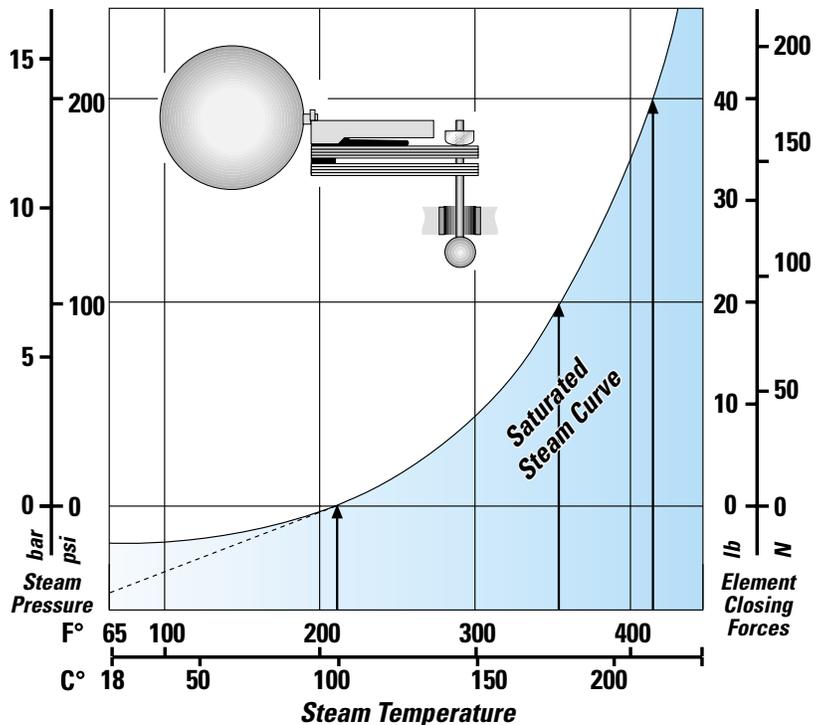


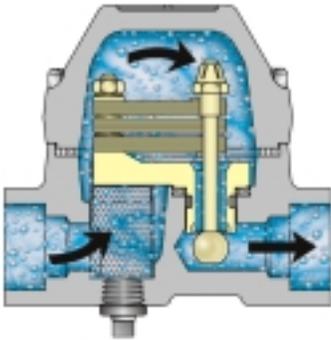
Chart 3 The patented Multi-element Principle combined with a float.

# HOW IT WORKS

## THE 4 PURPOSE VALVE AND ITS FUNCTION IN THE VELAN UNIVERSAL BIMETALLIC STEAM TRAP

### FAST WARM UP

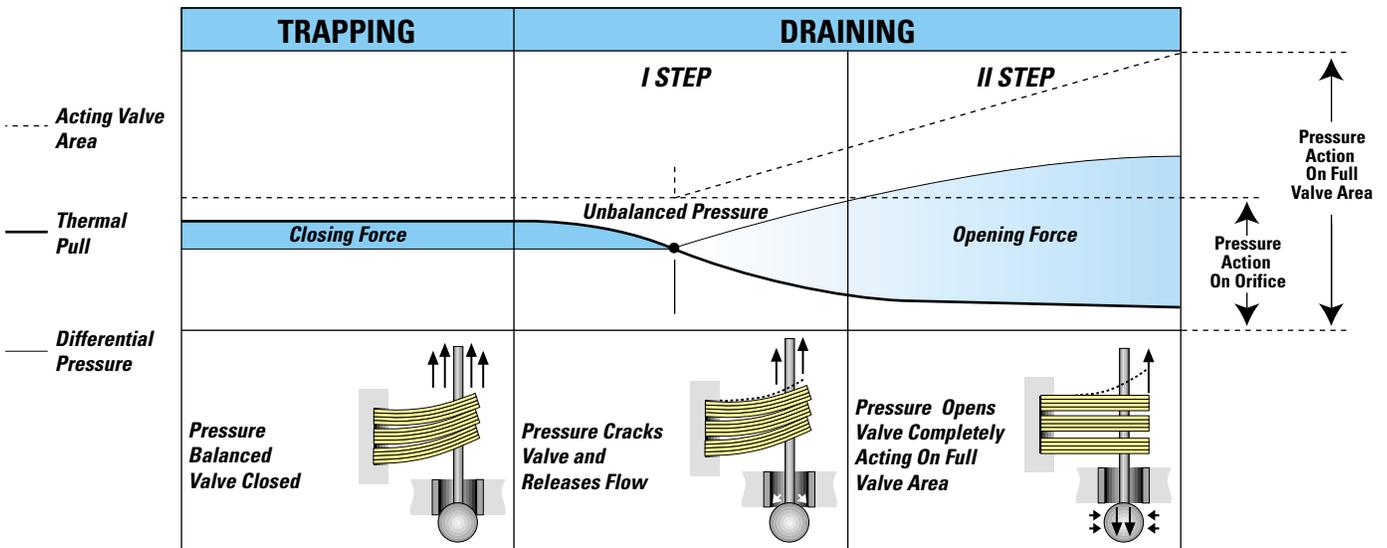
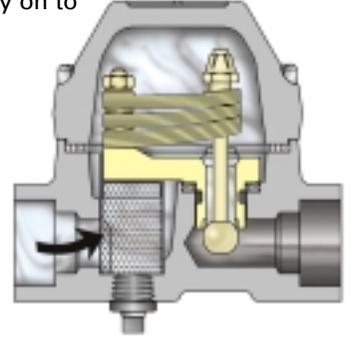
The discharge valve is open, allowing air and cold water to be discharged rapidly. The period of waiting to start a process is reduced to minutes – there is no air binding, water-logging or steam locking to delay equipment warm up.



Actual tests show that up to 2 1/2 hours may be saved on each "warm-up" because Velan Steam Traps have a much greater venting capacity than other traps, due to large orifice.

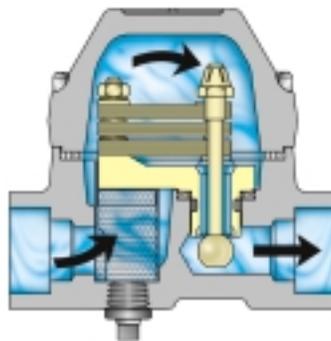
### POSITIVE TRAPPING

Incoming steam causes the bimetal to deflect. This thermal pull of the bimetal element acts on the valve stem overcoming the steam pressure closing the valve. The ball valve is pulled tightly on to its seat preventing weeping and loss of live steam. The thermal pull increases or decreases as a function of temperature, in the same relation as the temperature and pressure of the saturated steam. The same element can be used for varying steam pressures within wide pressure ranges.



### TWO STEP DRAINAGE

When steam condenses into water, the thermal pull of the bimetal is gradually reduced until the line pressure on the valve releases it from the valve seat and allows condensate to be discharged.

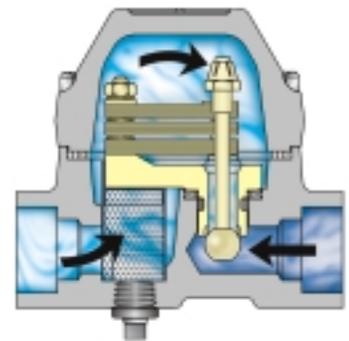


This is the first step in the smooth and quick opening of the valve, without noise or violent action. When the flow is released, the unbalanced pressure acts on the full valve area. The force to overcome the thermal pull increases and opens the orifice to full capacity.

### CHECK VALVE ACTION

Back pressure in the discharge pipe, a sudden drop in steam pressure a rapid fluctuation or discharging to overhead lines causes back flow of condensate.

To prevent this possible back flow or condensate entering the equipment not in service, separate check valves have to be installed as near to the trap as possible. In Velan Steam Traps the discharge valve in the trap acts as a check valve providing full back flow control.

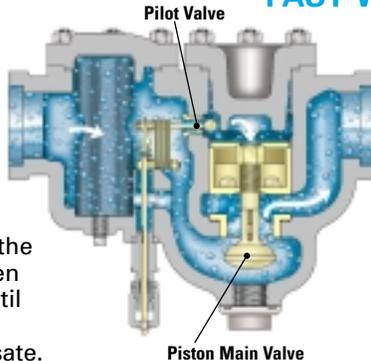


# HOW IT WORKS

## THE 4 PURPOSE VALVE AND ITS FUNCTION IN THE VELAN PISTON OPERATED & THE MONOVALVE FLOAT BIMETALLIC STEAM TRAP

### PISTON OPERATED

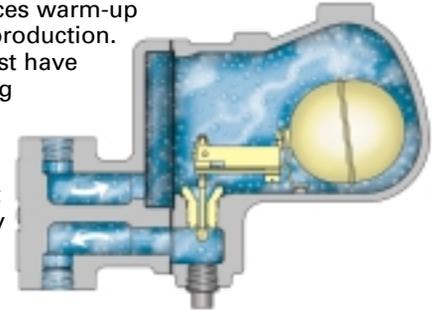
Cool air and condensate from the system is discharged through the large main valve orifice actuated by the piston, which is held open by its own weight when cold. As line pressure builds up pressure above the piston keeps the valve open at maximum discharge until the system is completely purged of air and condensate.



### MONOVALVE FLOAT BIMETALLIC

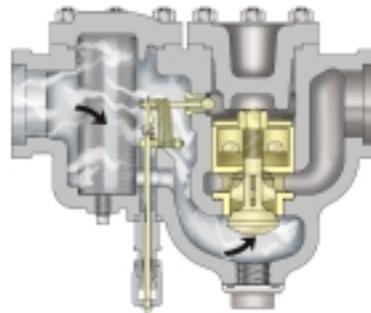
#### FAST WARM UP

Clearing air and moisture from a cold system rapidly reduces warm-up time and increases production. Other float traps must have a separate air venting facility while the Velan MFT utilizes the large main orifice for the fastest warm-up time of any comparable sized float trap.

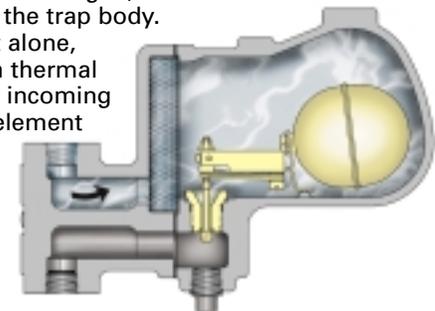


#### POSITIVE TRAPPING

Incoming steam contacting the bimetal element closes the pilot valve, thereby reducing the pressure acting on the piston. Line pressure below the main valve closes it tightly but smoothly, due to the partial pressure remaining in the piston chamber.

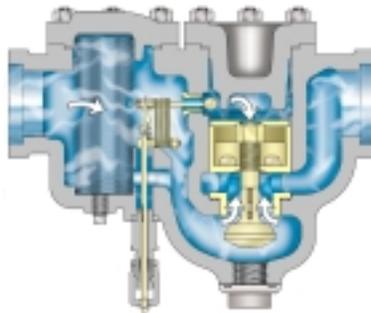


When condensate is discharged, the float mechanism rests on the trap body. The bimetal element alone, closes the valve with thermal power developed by incoming steam. The bimetal element is a function of the saturated steam curve, therefore operates efficiently at any pressure within its range.

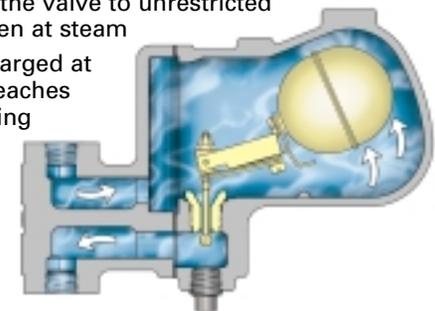


#### CONDENSATE DISCHARGE

When condensate and air collect in the trap body, the bimetal force is reduced, line pressure opens the pilot valve, pressurizing the piston chamber and forcing the main valve open against line pressure by virtue of the greater piston area.

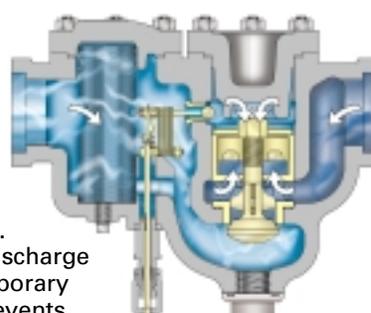


If condensate builds up in the trap body, the float becomes buoyant, and opens the valve to unrestricted flow. Condensate even at steam temperature is discharged at the same rate as it reaches the trap. No air binding or water logging irrespective of adverse conditions. The trap drains by gravity and **will not freeze**.

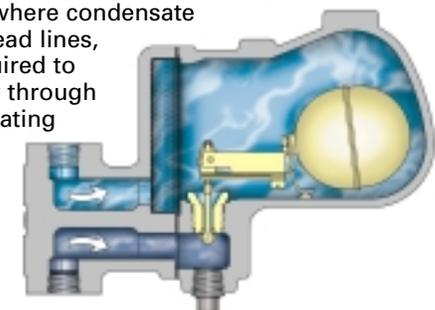


#### CHECK VALVE ACTION

Excess back pressure, a drop in line pressure, or discharging to overhead return lines, can cause a reverse flow of condensate through the trap. Normally separate check valves are required to prevent this occurrence. The Velan type SP main discharge valve also works as a temporary piston check valve and prevents back flow.



When pressure is off, equipment discharging to a common return, or where condensate is returned to overhead lines, a check valve is required to prevent reverse flow through the trap. The free-floating MFT mechanism shuts immediately the reverse flow and no additional device is required.

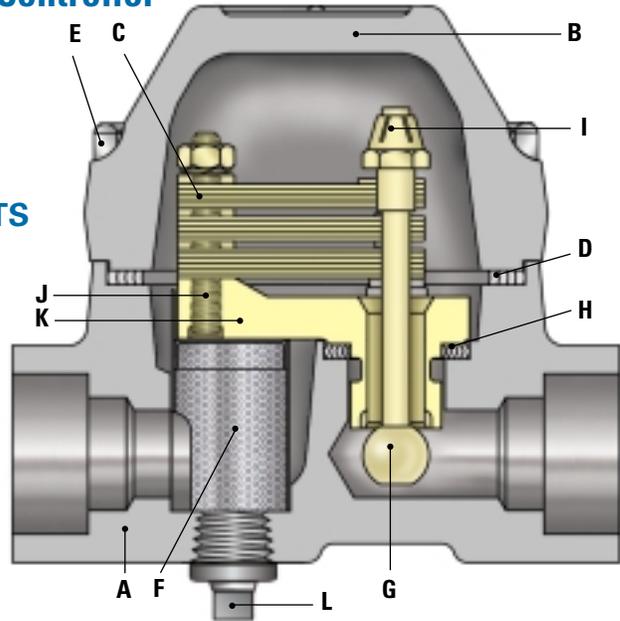


# VELAN FORGED UNIVERSAL BIMETALLIC STEAM TRAPS

## Type TS, TSF & SF with Cage Unit, Air Vent, Check Valve, Strainer & Optional Temperature Controller

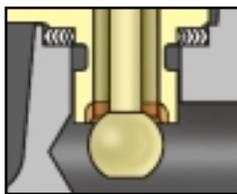


Type TS

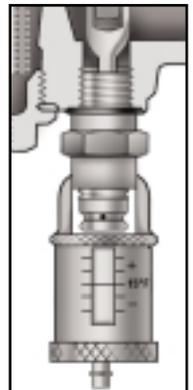


### TYPE TS, TSF & SF DESIGN FEATURES

- Forged valve body and cover (A, B)**  
 offer the advantages of high strength, structural integrity and reliability that make it an ideal choice for steam service.
- Stainless Steel Trim**
- Cage Unit (K, C, J, G, I)**  
 The advanced cage unit design in Velan Steam Traps combines a bimetal element, hardened Rc 58 min. ball valve and a Stellite seat area all in one factory-tested assembly. Replacement of all wearing parts can be achieved in less than two minutes, with the trap remaining in-line.
- Stellite Seats**  
 All Velan valve seats are Stellite faced to increase their resistance to the high degree of wear through velocity of flow, dirt and scale.
- Integral strainer (F)**  
 Stainless steel screens are integral in all three models to protect the trap operating mechanism from damage by dirt or scale. No extra fittings or installation costs are required. Free strainer area minimum 5 to 1. Perforation is 0.031" (0.8 mm).
- Universal operation**  
 The individual segments of the bimetallic element act consecutively, developing forces in close relation to the saturated steam curve. This permits sensitive, efficient trap operation at all



- pressures from 1 psi to maximum, without orifice change or adjustment.
- Silent operation** – no violent line shocks.
- Positive closing**  
 Every Velan steam trap closes tightly on saturated steam temperature. Positive closing for long periods on dry superheated steam has enormous advantages in power plant and marine service.
- All-position operation** simplifies piping layout.
- Freezeproof**  
 Velan traps do not require a reservoir of priming water in the body to operate. When installed vertically with inlet on top, they drain completely when cold, and are freezeproof without insulation.
- Positive condensate drainage** for process work.
- Optional Temperature controller on SF**  
 An ingenious device that allows adjustment of factory setting under full steam pressure. Condensate discharge temperature can be increased or decreased to meet the specific requirements of any process application. Up to 30% of energy can be saved by extracting the sensible heat of steam.
- Other options include:**  
 NPT blow down plug, Piping King Units complete with valving.



# VELAN FORGED UNIVERSAL BIMETALLIC STEAM TRAPS

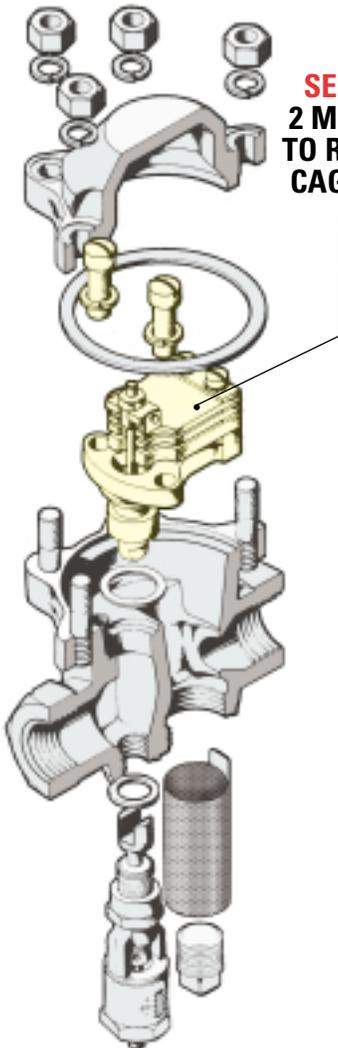
## STANDARD MATERIALS

PART	MATERIALS
A Body	Forged carbon steel A105 [C. Max. 0.25] Forged stainless steel F316 <sup>(1)</sup>
B Cover	Same as body material
C Bimetal element	Truflex GB-14
D Cover gasket	Stainless steel with graphite filler
E Cover bolt <sup>(2)</sup>	Chrome moly. alloy
F Strainer	Stainless steel
G Stem & ball	SS, ball valve 58 Rc min.
H Cage unit gasket	Stainless steel spiral wound with graphite filler
I Self-lock adjusting nut	Stainless steel
J Fixing screw	Stainless steel
K Bimetal holder	Stainless steel
L Plug: 3/8" - NPT	Carbon steel

(1) Type TS only. (2) B7 (A105), B8M2 (F316)

## CONNECTIONS:

- Screwed
- Socketweld
- Buttweld
- Flanged

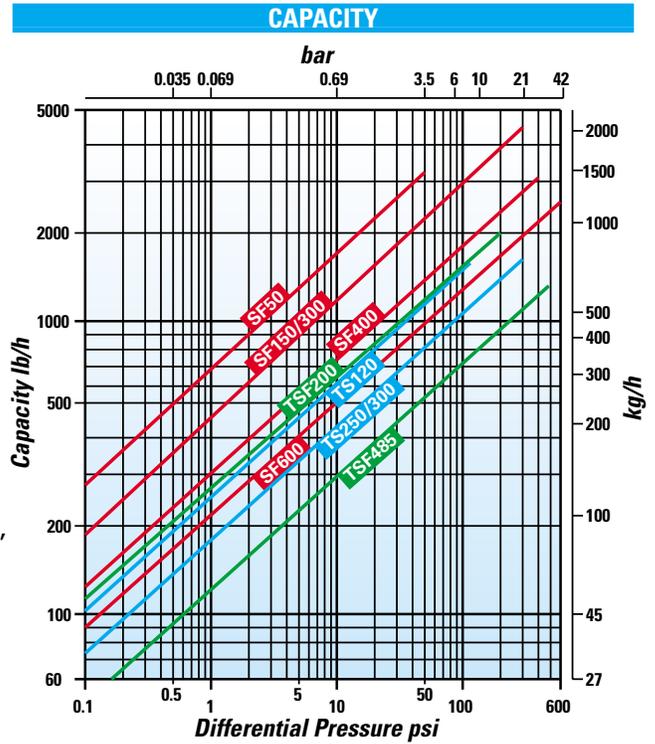


**SERVICE:  
2 MINUTES  
TO REPLACE  
CAGE UNIT**

The performance graph indicates the continuous discharge capacities of condensate per hour at various pressure differentials across the trap.

## APPLICATIONS

- **TS & TSF**  
Steam tracing or instrument cabinet service etc.
- **TSF & SF**  
Storage tank heating, sterilizers, cookers, dry kilns, water heaters, greenhouse coils, fuel oil heaters, drip legs, drum dryers, platen presses, tire moulds etc.
- **SF**  
High or low pressure drips, plating tank, vacuum pans, evaporators, pipe coils, bleach tanks etc.



## ENGINEERING DATA

TYPE	PRESSURE RANGE psi/bar	MATERIAL	MAX. TEMP. °F/°C	ORIFICE	MAX. CAPACITY lb/h kg/h
TS	0-120	A105 <sup>(1)</sup>	850 <sup>(2)</sup> 454	3/8	1,650
	0-8			9.5	750
	0-250			5/16	1,500
	0-17			8	682
TSF	0-300	A105	850 <sup>(2)</sup> 454	5/16	1,700
	0-21			8	773
	0-200			3/8	2,000
SF	0-14	A105	850 <sup>(2)</sup> 454	9.5	909
	0-485			1/4	1,400
	0-33.5			6.4	636
	0-50			3/4	3,250
	0-3.5			19	1,477
	0-150			1/2	3,250
	0-10.4			12.7	1,477
	0-300			1/2	4,500
	0-21			12.7	2,045
	0-400			3/8	3,100
	0-28			9.5	1,409
	0-600			5/16	2,600
0-42	8	1,182			

(1) Also available in: F316, Max. temp. 1,000°F (537°C).  
(2) Permissible, but not recommended for prolonged use above 800°F (426°C).

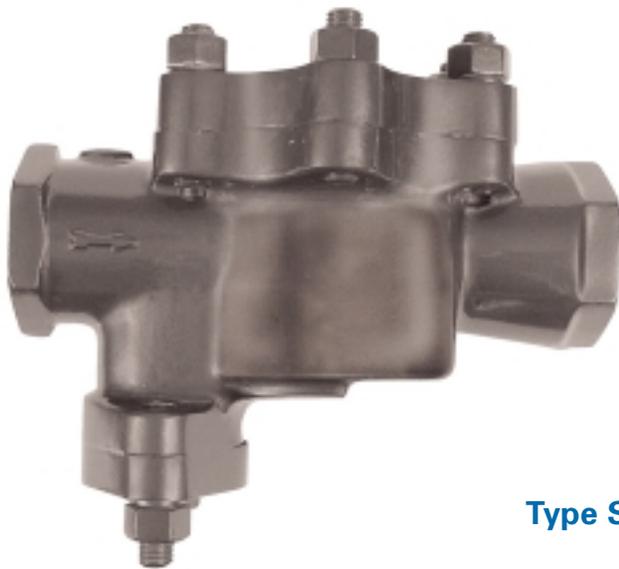
## DIMENSIONS & WEIGHTS

TYPE	SIZE in/mm	A Face to Face			B Center to Bottom	C Center to Top	Weight lb/kg		
		SCR/SW	BW	FLG			SCR/SW	BW	FLG
TS	3/8	4	10	6	7/8	2 7/8	4	6	8
	1/2	10	15	20	22	73	2	2.7	3.6
TSF	1/2	4	10	6	1	3 1/8	4.25	6.5	11
	3/4	10	25	15	25	79	2	3	5
SF	1/2	43/8	103/8	73/8	1	3 1/2	8	9	14
	3/4	111	264	187	25	89	3.6	4	6.4
SF	1/2	6 1/8	12 1/8	8 1/8 <sup>(1)</sup>	2 1/8	4 3/4	13	16	21 <sup>(2)</sup>
	3/4	156	308	206	54	121	6	7	9.5

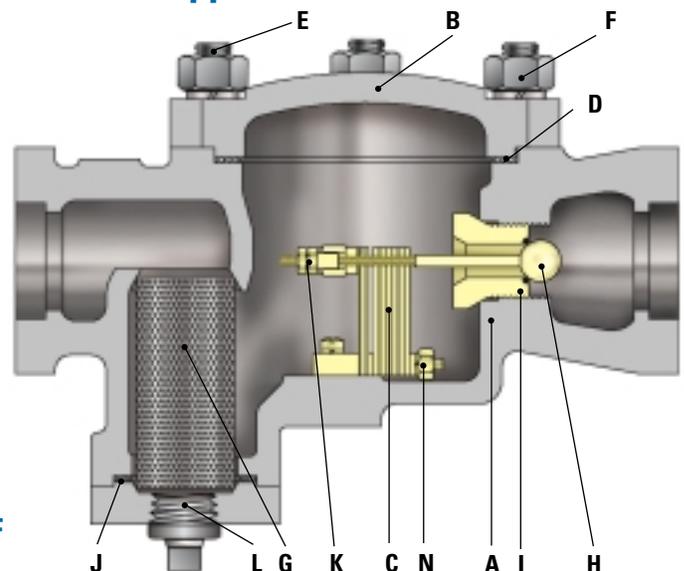
(1) SF 300/600 FLG: 9 9/16 in (232 mm). (2) SF 300/600 FLG: 23 lb (10.4 kg).

# VELAN UNIVERSAL BIMETALLIC STEAM TRAPS

## Type SSF with Air Vent, Check Valve, Strainer & Optional Temperature Controller To Service Large Volume Process Applications



Type SSF



### TYPE SSF DESIGN FEATURES

- **Universal operation**

The individual segments of the bimetallic element act consecutively, developing forces in close relation to the saturated steam curve. This permits sensitive, efficient trap operation at all pressures from 1 psi to maximum, without orifice change or adjustment. An ideal feature for "complete trap standardization".

- **Easy internal maintenance**

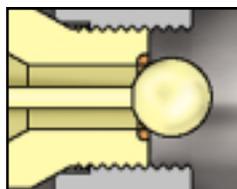
The removal of the body cover provides easy access to the bimetallic element and seat. The removal of the strainer cover permits quick and easy removal of the strainer.

- **Automatic air venting - good discharge capacity**

Air and cold condensate is discharged through a full orifice efficiently ensuring fast warm-up of equipment.

- **Valve seats Stellite**

All Velan valve seats are Stellite faced to increase their resistance to the high degree of wear through velocity of flow, dirt and scale.



- **Integral strainer**

An integral stainless steel strainer protects the trap operating mechanism from damage by dirt or scale. No extra fittings or installation costs are required. Free strainer area minimum 5 to 1. Perforation is 0.031" (0.8 mm).

- **Positive closing**

Every Velan trap closes tightly on saturated steam temperature. Positive closing for long periods on dry superheated steam has enormous advantages in power plant and marine service.

- **All-position installation** simplifies piping layout.

- **Silent operation** – no violent line shocks.

- **Freezeproof**

Velan traps do not require a reservoir of priming water in the body to operate. When installed vertically with inlet on top, they drain completely when cold, and are freezeproof without insulation.

- **Positive condensate drainage** for process work.

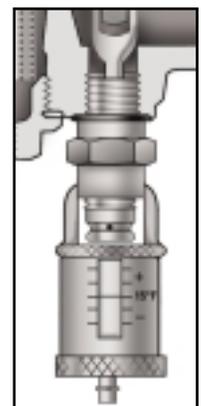
- **Silent operation** – no violent line shocks.

- **Optional Temperature controller**

An ingenious device that can be adapted to most Velan models permitted adjustment of factory setting under full steam pressure. Condensate discharge temperature can be increased or decreased to meet the specific requirements of any process application. Up to 30% of energy can be saved by extracting the sensible heat of steam.

- **Optional Extras include:**

Thermometer, strainer blowdown valve and Piping King Units complete with valving.



# VELAN UNIVERSAL BIMETALLIC STEAM TRAPS

## STANDARD MATERIALS

PART	MATERIALS	
A	Body	Cast carbon steel WCB [C. Max. 0.25 ]
B	Cover	Carbon steel
C	Bimetal element	Truflex GB-14
D	Cover gasket	Stainless steel spiral wound with graphite filler
E	Cover stud	Alloy steel
F	Cover nut	Carbon steel
G	Strainer	Stainless steel
H	Stem & ball	SS, ball valve 58 Rc
I	Seat	SS hardfaced Stellite 6
J	Strainer cover gasket	Stainless steel spiral wound with graphite filler
K	Adjusting nut & locknut	Stainless steel
L	Strainer blow-down plug	Carbon steel
N	Fixing screw & washer	Stainless steel

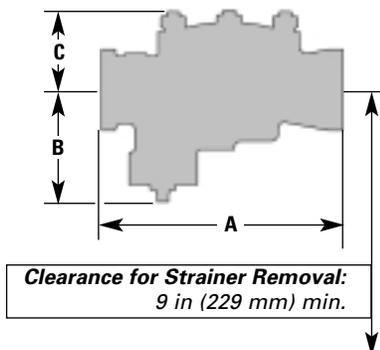
## SSF APPLICATIONS

- For draining: oil storage tank coils, acid stills, purifiers, feed water heaters, flush tanks, separators, vacuum pans, heat exchangers, high pressure process equipment, high pressure main lines and general industrial service in medium to high pressure/temperature applications with high condensate discharge rates.

Widely used in Power, Petroleum and Chemical Plants, Marine service and Steel Industries to meet safety requirements.

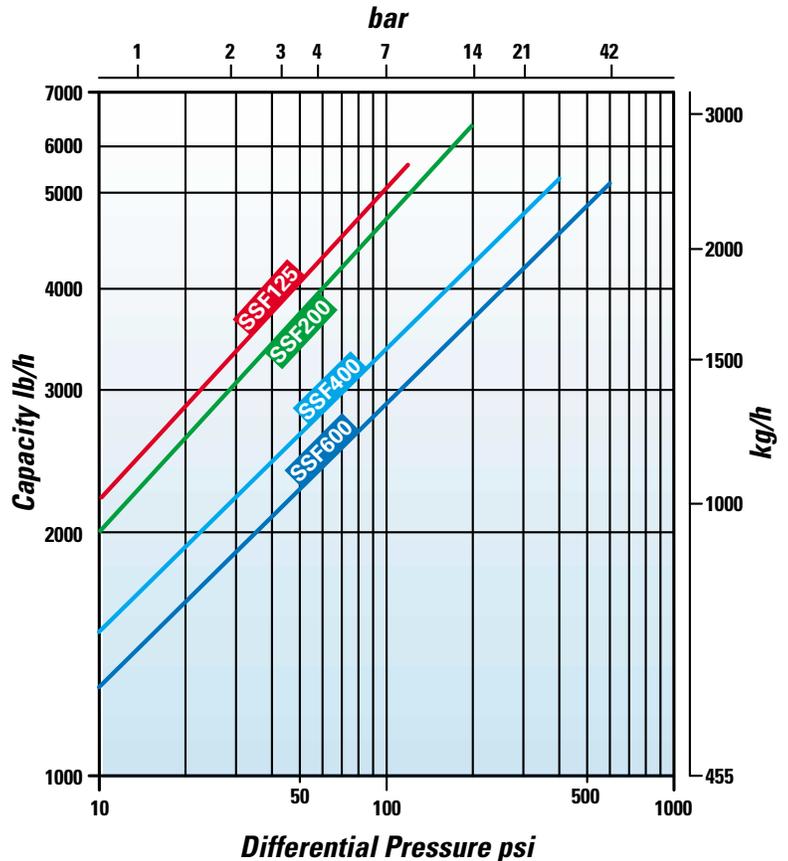
## CONNECTIONS:

- Screwed
- Socketweld
- Butt weld
- Flanged



## CAPACITY

The performance graph indicates the continuous discharge capacities of condensate per hour at various pressure differentials across the trap.



## ENGINEERING DATA

TYPE	PRESSURE RANGE psi/bar	MATERIAL	MAX. TEMP. °F/°C	ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
SSF-125	0-125	WCB	850 <sup>(1)</sup> 454	1	5,750
	0-8.5			25	2,608
SSF-200	0-200			7/8	6,400
	0-14			22	2,903
SSF-400	0-400			9/16	5,300
	0-28			14	2,409
SSF-600	0-600			1/2	5,200
	0-42			12.7	2,360

(1) Permissible, but not recommended for prolonged use above 800°F (426°C).

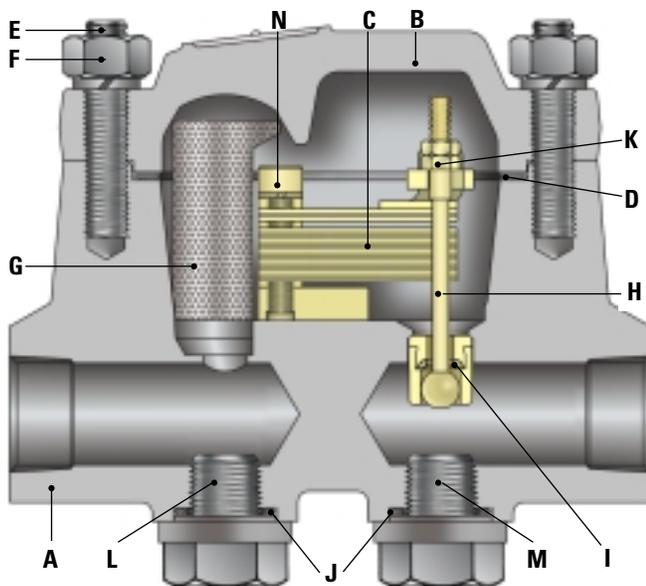


## DIMENSIONS & WEIGHTS

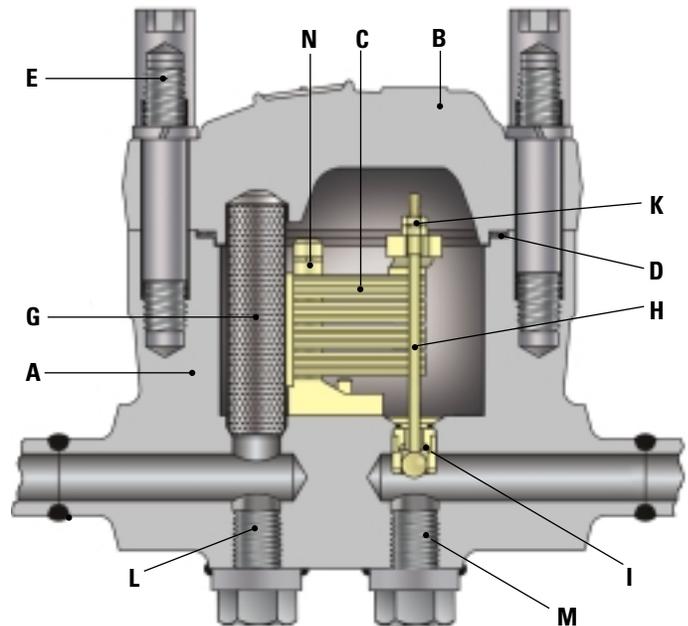
TYPE	SIZE in/mm	A Face to Face			B Center to Bottom	C Center to Top	Weight lb/kg		
		SCR/SW	BW	FLG			SCR/SW	BW	FLG
SSF-125	2 50								
SSF-200	1 1/2	11	17	14 1/4	5 3/8	3 1/2	30	33	40
	40	279	432	362	137	89	14	15	18
SSF-400	2								
SSF-600	50								

# VELAN FORGED HP/HT STEAM TRAPS

## Type N for High Pressure/High Temperature Service Complete with Air Vent, Check Valve and Strainer



**Type N675**



**Type N2500**

### TYPE N DESIGN FEATURES

- **The only positive closing steam trap on superheated steam**

The bimetallic element is a function of the saturated steam curve (pages 2 & 3) and its sensitivity to the temperature change assures an immediate reaction to both steam and condensate for the entire pressure range. At saturated temperature the valve is closed. Superheated steam increases the thermal pull of the bimetallic element, closing the valve even tighter. See page 2 for details.

- **Easy Access** to all the internal operating parts when the body cover is removed.

- **Forged valve body and cover (A, B)** offer the advantages of high strength, structural integrity and reliability that make it an ideal choice for steam service.

- **Gaskets (D, J)** are spiral wound, stainless steel with graphite.

- **Trim** is stainless steel with ball 58 Rc min.

- **Welded-in seats are Stellite (I)** to increase their resistance to high pressure/temperature applications and wear through velocity of flow, dirt and scale. N150/300 has screwed seat.



- **Freezeproof in vertical position - inlet on top** without insulation – complete drainage when cold.

- **Positive condensate drainage.**

- **Integral strainer (G)**

Stainless steel screens are integral to protect the trap operating mechanism from damage by dirt or scale. No extra fittings or installation costs are required. Free strainer area minimum 5 to 1. Perforation is 0.031" (0.8 mm).

- **Universal operation (C)**

The individual segments of the bimetallic element act consecutively, developing forces in close relation to the saturated steam curve. This permits sensitive, efficient trap operation at all pressures from 1 psi to maximum, without orifice change or adjustment. An ideal feature for "complete trap standardization".

- **All-position installation** simplifies piping layout.

Can be installed vertically or horizontally. Both plugs can be replaced with valves. Can be adjusted to suit plant requirements.

- **Other options include:**

NPT blow down plug, strainer blowdown valve and Piping King Unit with all valving.

### APPLICATIONS

Type N steam traps resolve all problems with high pressure steam trapping on superheated steam lines in thermal power plants or aboard ships. Over 1,100 U.S. Navy ships have used Velan Steam Traps.

- Steam main drainage,
- Turbine drains,
- Desuperheater,
- High pressure processing,
- General high pressure/ temperature service.

# VELAN FORGED HP/HT STEAM TRAPS

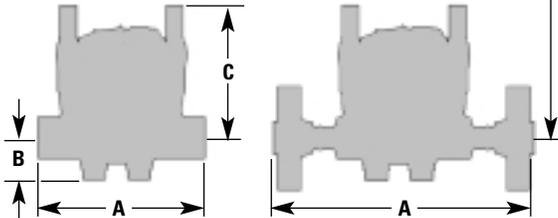
Type N Steam Traps also available as one unit Piping Kings with Velan Bonnetless Globe Valves or Power Ball Valves

## STANDARD MATERIALS

PART	MATERIALS
A Body	Forged carbon steel A105 [C. Max. 0.25] Forged alloy steel F22, F91 Forged stainless steel F316
B Cover	Same as body material
C Bimetal element	Truflex GB-14
D Cover gasket	Stainless steel spiral wound with graphite filler
E Cover stud <sup>(1)</sup>	Chrome moly. alloy
F Cover nut <sup>(1)</sup>	Carbon steel, Stainless steel
G Strainer	Stainless steel
H Stem & ball	Stainless steel, ball 58 Rc
I Seat	SS hardfaced with Stellite 6
J Plug gasket	Stainless steel spiral wound with graphite filler
K Adjusting nut & locknut	Stainless steel
L Strainer blowdown plug	Carbon steel or chrome moly. steel
M Test Plug	Carbon steel or chrome moly. steel
N Fixing screw & washer	Stainless steel

(1) B7/2H (A105), B8M/8M (F316), B16/Gr.4 (F22), Nimonic 80A (F91).

**Clearance for Strainer Removal:** N150/300; 5 1/2 in (140 mm) min., N2500/2600; 15 in (381 mm) min.



Type N675



Type N2500



## ENGINEERING DATA

TYPE	PRESSURE RANGE psi/bar	MATERIAL	MAX. TEMP. °F/°C	ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
N150	0-150 0-10.5	A105 <sup>(1)</sup>	850 <sup>(1)(2)</sup> 454	1/2 12.7	2,800 1,272
N300	0-300 0-21				3,500 1,590
N675	0-675 0-46.5			5/16 8	2,900 1,315
N900	0-900 0-62			1/4 6.4	1,850 841
N1500	0-1500 0-103				2,100 955
N2500	500-2500 34.5-172	F22	1050 565	5/16 8	4,800 2,182
N2600	500-2600 34.5-179	F91	1100 593		4,900 2,227

(1) Also available in: F22, max. temp. 1,050°F (565°C)  
F316, max. temp. 1,000°F (537°C).  
(2) Permissible, but not recommended for prolonged use above 800°F (426°C).

## CONNECTIONS:

N150-1500: ● Screwed ● Socketweld ● Buttweld ● Flanged  
N2500-N2600: ● Socketweld ● Buttweld ● Flanged

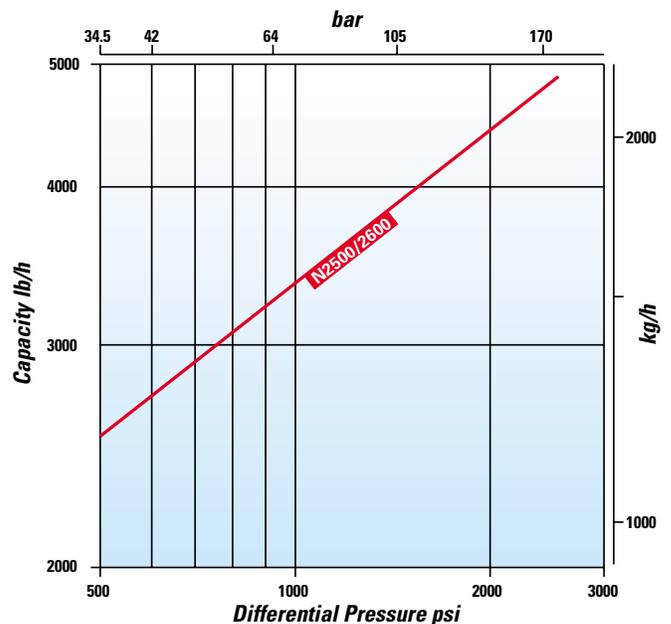
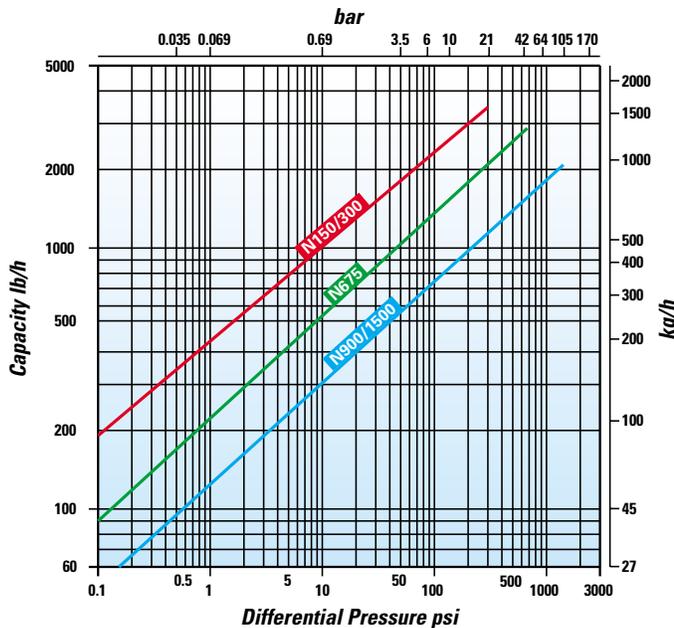
## DIMENSIONS & WEIGHTS

TYPE	SIZE in/mm			A Face to Face			B Center to Bottom	C Center to Top	Weight lb/kg		
				SCR/SW <sup>(1)</sup>	BW	FLG			SCR/SW*	BW	FLG
N150 N300 N675 N900 N1500	1/2 15	3/4 20	1 25	7 1/4 184	13 1/4 337	11 1/4 286	2 51	4 1/2 115	24 11	26 12	37 17
N2500 N2600	1/2 15	3/4 20	1 25	10 254	16 406	15 1/2 394	2 5/8 67	8 1/8 206	80 36	83 38	105 48

(1) Screwed connection not available for N2500/N2600.

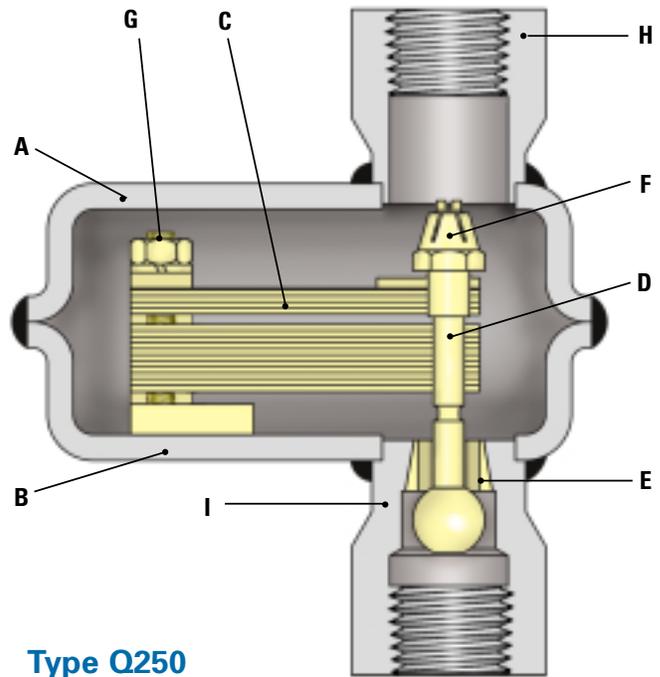
## CAPACITY

The performance graphs indicate the continuous discharge capacities of condensate per hour at various pressure differentials across the trap.



# VELAN HERMETICALLY SEALED STEAM TRAP

## Type Q250 Stainless Steel Steam Traps for All Position Installation with Air Vent, Check Valve & Self-Aligning Precision Ball Valve



Type Q250

### DESIGN FEATURES

- **Hermetically sealed body**  
Seal welded body contains all operating parts.
- **Positive closing**  
The bimetallic element is a function of the saturated steam curve (pages 2 & 3) and its sensitivity to the temperature change assures an immediate reaction to both steam and condensate for the entire pressure range. At saturated temperature the valve is closed.
- **All-position installation**  
Simplifies piping layout for easy plant standardization.
- **Self-aligning precision ball valve**  
Single free-floating stainless steel hardened Rc 58 min. ball valve.
- **Valve seats Stellite**  
All Velan valve seats are Stellite faced to increase their resistance to the high degree of wear through velocity of flow, dirt and scale.
- **Air venting - good discharge capacity**  
Air and cold condensate is discharged through a full orifice efficiently ensuring fast warm-up of equipment.



- **Check valve operation**  
The main valve acts as a check valve preventing back flow.
- **Positive condensate drainage** for process work.
- **Guaranteed against water hammer**  
The downstream valve acts as a release valve on the excess water pressure without damage to internal parts.
- **Freezeproof installation**  
Velan traps do not require a reservoir of priming water in the body to operate. When installed vertically with inlet on top, they drain completely when cold, and are freezeproof without insulation.

### APPLICATIONS

- Steam tracing, line drainage and most general process applications.

# VELAN HERMETICALLY SEALED STEAM TRAP

## STANDARD MATERIALS

PART		MATERIALS
A	Inlet shell	Stainless steel 304L
B	Outlet shell	Same as inlet shell material
C	Bimetal element	Truflex GB-14
D	Stem & ball	SS, ball valve 58 Rc min.
E	Seat	Stellite 6
F	Self locking adjustable nut	Stainless steel
G	Fixing screw	Stainless steel
H	Inlet nipple	Stainless steel 304L
I	Outlet nipple	Stainless steel 304L

You need **19** types of hermetically sealed stainless steel inverted bucket steam traps to cover the range of this **1** Velan Steam Trap for 0-250 psi (0-17 bar) and 2000 lb/h (907 kg/h) capacity.

## SIMPLE PRINCIPLE OF OPERATION

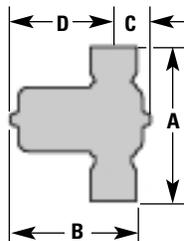
A single free-floating ball valve:

- Vents air.
- Discharges condensate.
- Traps steam.
- Acts as a check valve.

(see page 2-4 for details)

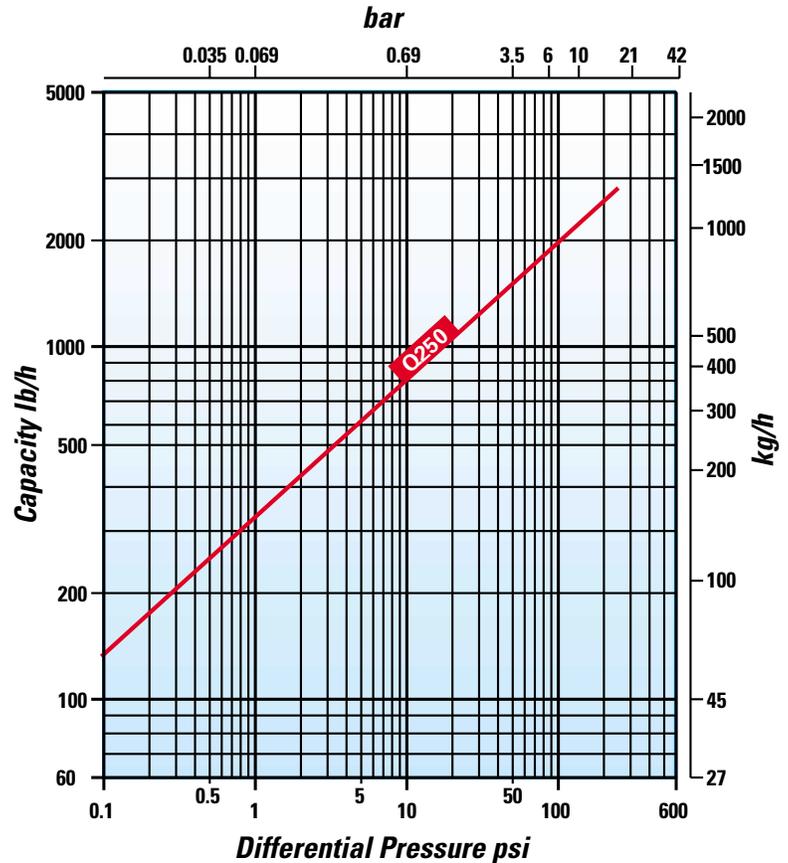
## CONNECTIONS:

- Screwed
- Socketweld



## CAPACITY

The performance graph indicates the continuous discharge capacities of condensate per hour at various pressure differentials across the trap.



Type Q250



## ENGINEERING DATA

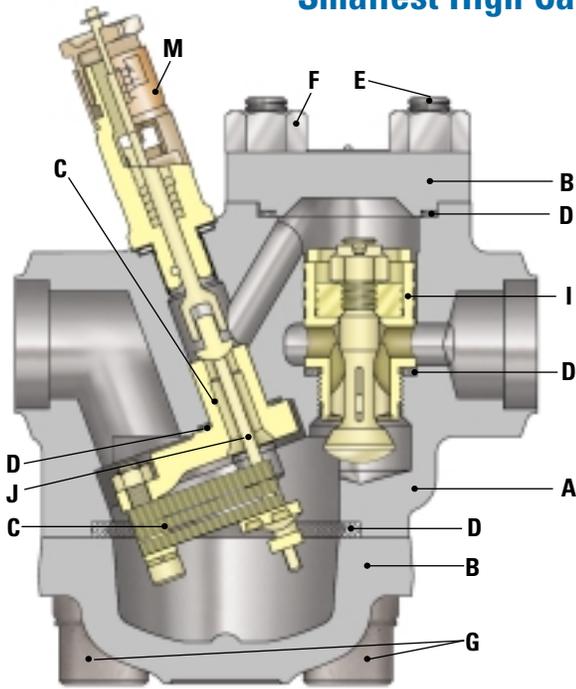
TYPE	PRESSURE RANGE psi/bar	MATERIAL	MAX. TEMP. °F/°C	ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
Q250	0-250	SS 304L	500	3/8	2,700
	0-17		260	9.5	1,227

## DIMENSIONS & WEIGHTS

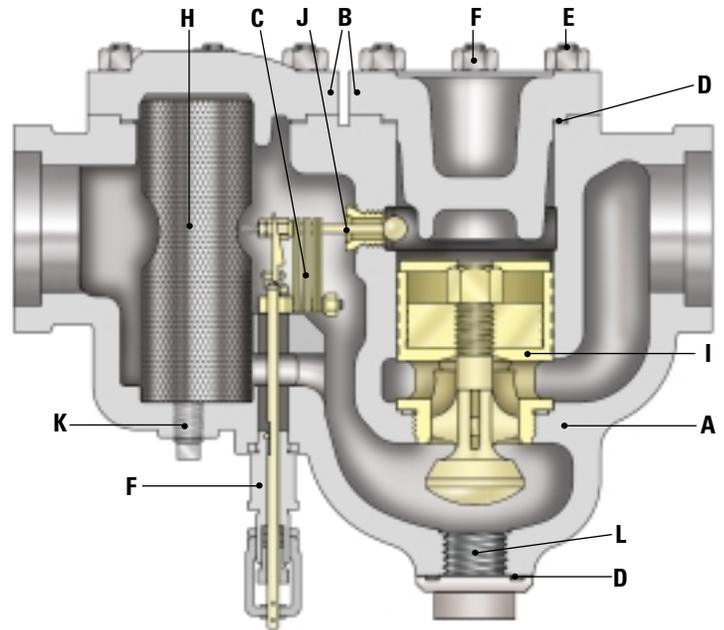
TYPE	SIZE in/mm	A Face to Face	B Overall Diameter	C Center to Bottom	D Center to Top	Weight lb/kg
Q250	1/2 15	4 102	3 1/2 89	7/8 22	2 5/8 67	2 1
	3/4 20	4 1/2 114	3 1/2 89	7/8 22	2 5/8 67	2 1

# VELAN HIGH CAPACITY PISTON OPERATED STEAM TRAP

## Type SPF & SP for High Pressure Service Smallest High Capacity Trap Ever Developed



**Type SPF (Forged)**

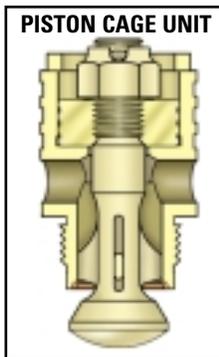


**Type SP (Cast)**

### TYPE SPF & SP DESIGN FEATURES

- **Piston Cage Unit**

The advanced piston cage unit design combines a liner, piston, main seat and main valve into one factory-tested assembly to ensure precise alignment and simple maintenance. In the SPF Type there is also a bimetallic cage unit.



- **Valve seats Stellite**

The main and pilot valve seats are Stellite faced to increase their resistance to the high degree of wear through velocity of flow, dirt and scale.

- **Small and lightweight design** for piping convenience, no mounting brackets required.

- **All in one construction unit**

Air vent, main valve, check valve, strainer and temperature controller are a single unit, ensuring perfect alignment and ease of maintenance.

- **Positive closing**

As steam contacts the bimetal element, the pull closes the pilot valve, reducing the pressure on the piston. Line pressure below the main valve closes the valve tightly on the seat (see pg. 5).

- **Positive condensate drainage** for process work.

- **Check valve operation**

The main valve acts as a check valve preventing back flow.

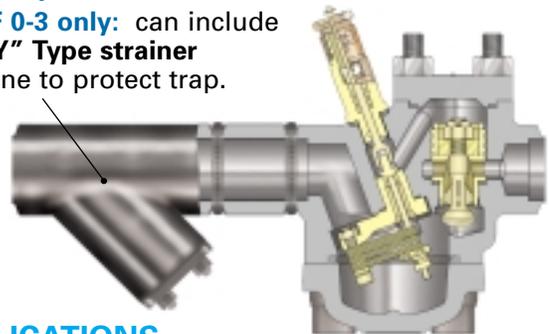
- **Temperature Controller**

controls and adjusts the discharge temperature of condensate which can be calibrated using a special thermometer (see page 29).

- **Other options include:** Piping King Units, thermometer.

**SP only:** Strainer blowdown valve.

**SPF 0-3 only:** can include a "Y" Type strainer in line to protect trap.



### APPLICATIONS

- **SP & SPF:** Reboilers, Purifiers, Vacuum pans, Heat Exchangers, Evaporators, Feed Water Heaters, Digesters, Desuperheaters, Steam Separators, Flash Tanks, Large Autoclaves, Steam catapult service on U.S. Navy aircraft carriers and other large capacity applications.

# VELAN HIGH CAPACITY PISTON OPERATED STEAM TRAP

## STANDARD MATERIALS

PART		MATERIALS	
		SPF	SP
A	Body	Forged carbon steel A105 Forged alloy steel F22	Cast steel WCB
B	Cover	Same as body material	
C	Bimetal element	Truflex GB-14	
D	Gasket	Stainless steel spiral wound with graphite filler	
E	Cover stud <sup>(1)</sup>	Chrome moly. alloy B7	
F	Cover nut <sup>(1)</sup>	Carbon or stainless steel	Carbon steel 2H
G	Cap screw <sup>(2)</sup>	Chrome moly. alloy	
H	Strainer	-	Stainless steel
I	Piston cage unit	Stainless steel	
J	Pilot valve	Stainless steel, ball 58 Rc min.	
K	Blowdown plug	-	Carbon steel
L	Bottom plug	-	Stainless steel
M	Temp controller	Stainless steel	

(1) B7/2H (A105), B16/Gr.4 (F22), B8M/8M (F316).

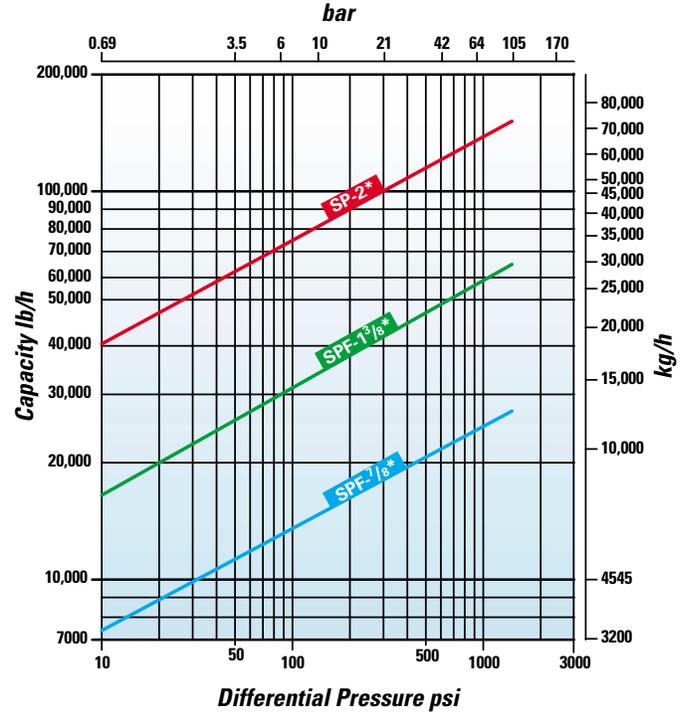
(2) F316 applies to SPF0-3 design only.

TYPE	PRESSURE RANGE psi/bar	MAX. TEMP. °F/°C			ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
		A105/WCB	F316	F22		
SPF0	10-200 0.69-14	850 <sup>(1)</sup> 454	1000 537	1050 565	7/8 22	17,000 7,727
SPF1	10-350 0.69-24					19,000 8,636
SPF2	10-600 0.69-42					22,000 10,000
SPF3	10-1500 0.69-103					27,000 12,273
SPF4	10-200 0.69-14	850 <sup>(1)</sup> 454	N/A	1050 565	1 3/8 35	38,000 17,272
SPF5	10-350 0.69-24					43,000 19,545
SPF6	10-600 0.69-42					49,000 22,272
SPF7	10-1500 0.69-103					63,000 28,636
SP6	10-200 0.69-14	850 <sup>(1)</sup> 454	N/A	2	51	90,000 40,909
SP7	10-600 0.69-42					130,000 59,090
SP8	10-1500 0.69-103					160,000 72,727

(1) Permissible, but not recommended for prolonged use above 800°F (426°C).

## CAPACITY

The performance graph indicates the continuous discharge capacities of condensate per hour at various pressure differentials across the trap.



\* Fraction represents orifice size.

## CONNECTIONS:

- Screwed
- Socketweld
- Buttweld
- Flanged

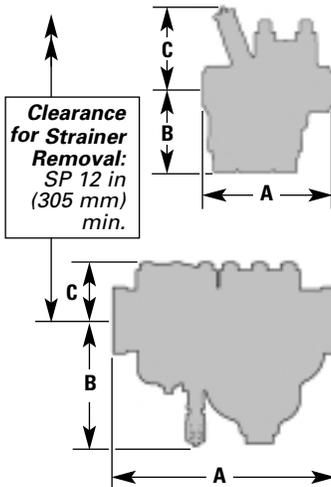
Type  
SPF



Type  
SP



## DIMENSIONS & WEIGHTS



TYPE	SIZE in mm	A Face to Face						B Center to Bottom	C Center to Top	WEIGHT lb/kg					
		SCR/SW		BW		FLANGED				SCR/SW		BW		FLANGED	
		200	350	600	1500	200	350			600	1500	200	350	600	1500
SPF 0,1,2,3	1 1 1/2	7 3/4	13 3/4	10 3/4	11	11	12 3/4	4 7/8	5 3/16	35	39	48	53	56	64
	25 40	197	349	273	279	279	324	124	132	16	18	22	24	25	29
SPF 4,5,6,7	1 1/2 2	8 3/4	14 3/4	12	12	12	14 1/4	5 1/8	5 1/2	50	55	67	69	81	100
	40 50	222	375	305	305	305	362	130	140	23	25	30	31	37	45

TYPE	SIZE in mm	A Face to Face						B Center to Bottom	C Center to Top	WEIGHT lb/kg					
		SCR/SW		BW		FLANGED				SCR/SW		BW		FLANGED	
		200	600	1500	200	600 & 1500	200			600 & 1500	200	600 & 1500	200	600 & 1500	
SP 6,7,8	2	15	21	18	19	22	9 1/8	4 1/4	115	120	118	123	139	170	
	50	54	56	457	483	559	232	108	52	55	54	56	63	77	
	2 1/2	381	533	457	483	559	232	108	52	55	120	125	151	192	
	65	55	57	457	483	559	232	108	52	55	55	57	69	87	
	3	16	22	122	127	155	216			122	127	155	216		
	80	406	559	56	58	70	98			56	58	70	98		

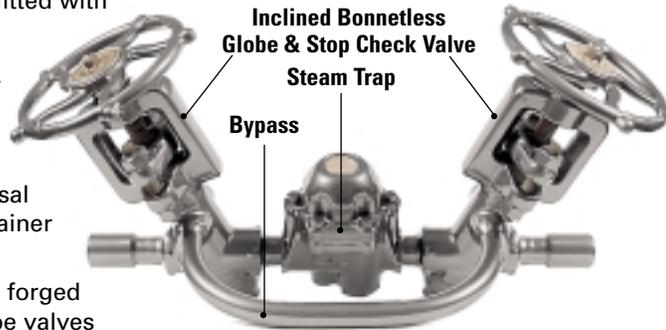
# VELAN PIPING KING PACKAGE UNITS

## *Velan Forged Piping King Automatic Condensate Drain Units A Unique Method in Steam Trap Piping*

The Piping King Package unit fitted with a bypass, enables the steam trap to be isolated from the system allowing routine maintenance to be carried out.

THE UNIT CONSISTS OF:

- The unique patented Universal Steam Trap with integral strainer and check valve
- Two high-quality bonnetless forged steel special stop check globe valves mounted on either side of the trap.



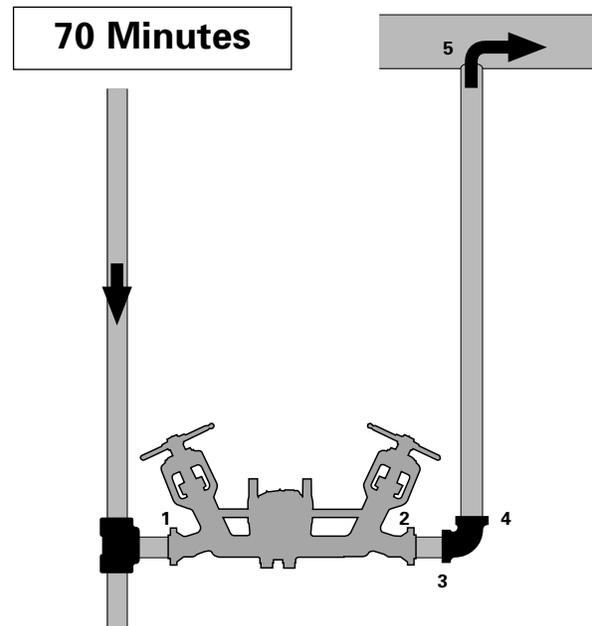
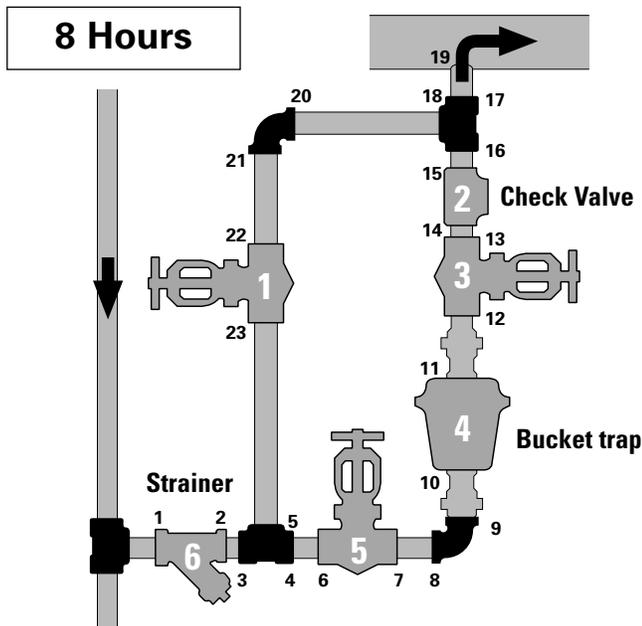
The valves are connected by the bypass pipe, enabling the steam trap to be isolated while the steam flow is maintained.

Piping King units are used extensively in power stations marine and similar applications where continuous operation is essential during routine maintenance. (See page 18, 19 for details.)

## *Velan Piping Kings Provide Substantial Savings, in Component Parts & Installation Costs*

### CONVENTIONAL UNIT WITH BYPASS (3 VALVES) AND BUCKET TRAP

### VELAN PIPING KING UNIT WITH BYPASS (2 VALVES ONLY)



#### 6 Units - 23 Welds

#### 1 Unit - 5 Welds

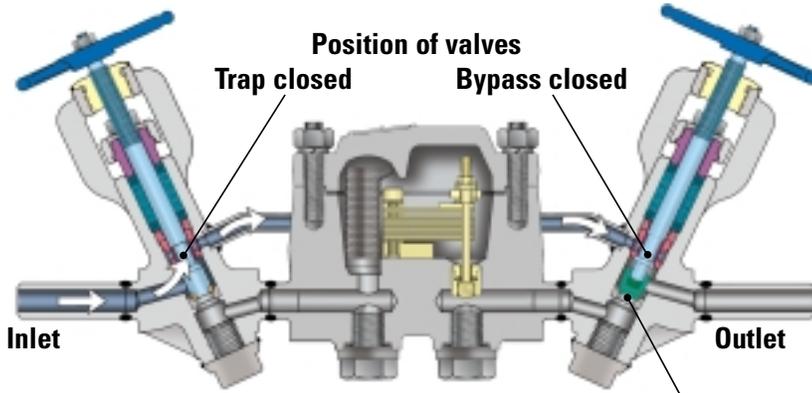
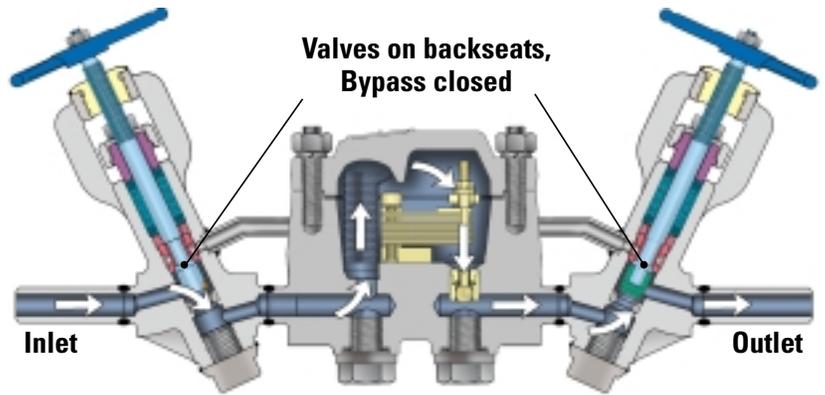
- |   |                                 |
|---|---------------------------------|
| 1 Steel $\frac{3}{4}$ " Bucket Steam Trap | 2 Elbows $\frac{3}{4}$ " (s.w.) |
| 3 Forged Steel Valves                     | 3 Tees $\frac{3}{4}$ " (s.w.)   |
| 1 Steel Strainer $\frac{3}{4}$ "          | 2 Unions $\frac{3}{4}$ "        |
| 1 Steel Check Valve $\frac{3}{4}$ "       | Fitting Time (2 hours)          |
| 23 Welded Joints (6 hours)                |                                 |

- |  |
|--|
| 1 Velan Piping King $\frac{3}{4}$ " Type NV-BY |
| 5 Welded Joints (1 hour)                       |
| Fitting Time (10 minutes)                      |

# HOW IT WORKS

## 1. AUTOMATIC STEAM TRAP OPERATION

Inlet valve and outlet valve both in top, closed position to provide double protection against leakage through the bypass.



## 2. COMPLETE SHUTOFF - NO FLOW TRAP ISOLATED FOR SERVICE

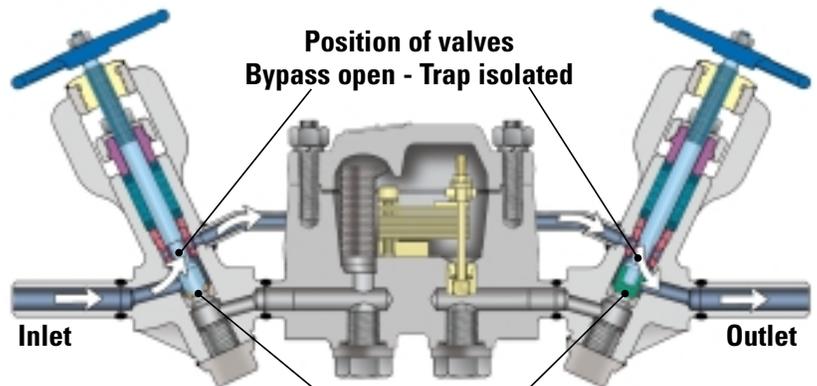
Inlet valve in bottom position, outlet valve in top position. The trap is now sealed off by the inlet valve and the bypass is closed by the outlet valve. The valve is protected from back-pressure by the check valve portion of the outlet valve.

Check valve closed by back pressure if any

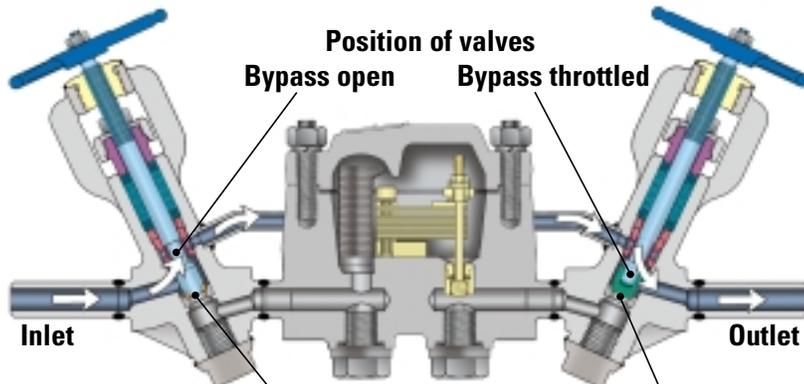
## 3. BYPASS OPEN - FULL FLOW TRAP ISOLATED FOR SERVICE PREFERRED SERVICE POSITION

Both inlet valve and outlet valves in bottom position to seal off the trap against flow and back-pressure.

Trap is isolated and ready for service.



Trap isolated - Bypass open



Trap isolated bypass open

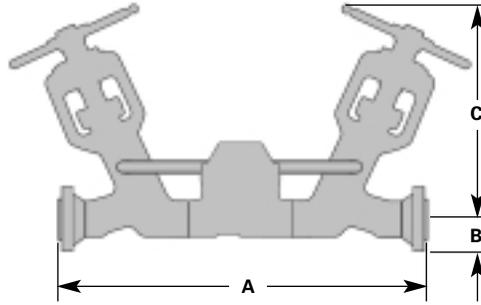
Check valve closed by line pressure through bypass

## 4. THROTTLED BY-PASSING - TRAP ISOLATED FOR SERVICE

Inlet valve in bottom position, outlet valve in intermediate position. The trap is sealed off by the inlet valve and flow through the bypass is restricted by the position of the outlet valve. The floating check valve of the outlet valve protects the trap from back pressure.

# VELAN PIPING KING PACKAGE UNITS

## TS-V-BY, TSF-V-BY & SF-V-BY



### ENGINEERING DATA

TYPE	PRESSURE RANGE psi/bar	ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
TS-V-BY (1)(2)	0-120 0-8	3/8 9.5	1,650 750
	0-250 0-17	5/16 8	1,500 682
	0-300 0-21	5/16 8	1,700 773
TSF-V-BY (1)	0-200 0-14	3/8 9.5	2,000 909
	0-485 0-33.5	1/4 6.5	1,400 636
	0-50 0-3.5	3/4 19	3,250 1,477
SF-V-BY (1)	0-150 0-10.4	1/2 12.7	3,250 1,477
	0-300 0-21	1/2 12.7	4,500 2,045
	0-400 0-28	3/8 9.5	3,100 1,409
	0-600 0-42	5/16 8	2,600 1,182

Material and maximum temperature:  
 (1) A105, max. temp. 850°F (454°C), which is permissible, but not recommended for prolonged use above 800°F (426°C).  
 (2) F316, max. temp. 1,000°F (532°C).

### DIMENSIONS & WEIGHTS

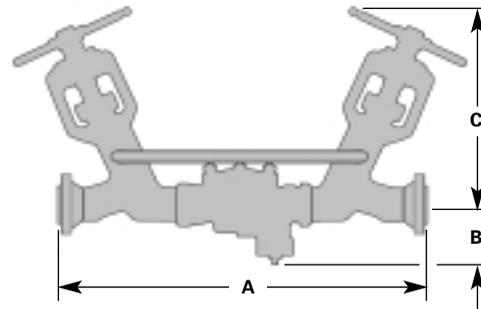
TYPE	SIZE in/mm	A Face to Face			B Center to Bottom	C Center to Top	Weight lb/kg		
		SCR/SW	BW	FLG			SCR/SW	BW	FLG
TS-V-BY	3/8 10	11 1/4 286	17 1/4 438	15 1/4 387	2 50	7 3/4 197	17 7.5	18 8	24 11
	1/2 15								
	3/4 20								
TSF-V-BY	1/2 15	11 5/8 295	17 5/8 448	15 5/8 397	2 50	7 3/4 197	29 13	30 14	35 16
	3/4 20								
	1/2 15								
SF-V-BY-50	1/2 15	13 3/8 340	19 3/8 492	17 1/8 435	2 50	7 3/4 197	40 18	42 19	48 22
	3/4 20								
	1 25								
SF-V-BY-150 SF-V-BY-300 SF-V-BY-400 SF-V-BY-600	1/2 15	13 3/8 340	19 3/8 492	17 3/8 441	2 50	7 3/4 197	40 18	42 19	48 22
	3/4 20								
	1 25								
	1 25								

## SSF-V-BY

### ENGINEERING DATA

TYPE	PRESSURE RANGE psi/bar	ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
SSF-V-F-125	0-125 0-8.5	1 25	5,750 2,608
	0-200 0-14	7/8 22	6,400 2,903
SSF-V-F-400	0-400 0-28	9/16 14	5,300 2,409
	0-600 0-42	1/2 12.7	5,200 2,360

Material and maximum temperature:  
 WCB, max. temp. 850°F (454°C), which is permissible, but not recommended for prolonged use above 800°F (426°C).



### DIMENSIONS & WEIGHTS

TYPE	SIZE in/mm	A Face to Face			B Center to Bottom	C Center to Top	Weight lb/kg		
		SCR/SW	BW	FLG			SCR/SW	BW	FLG
SSF-V-BY-125	2 50	27 686	33 838	31 787	5 3/8 137	16 11/16 424	198 90	198 90	200 91
	1 1/2 40	25 635	31 787	29 737	5 3/8 137	15 9/16 395	119 54	123 56	146 66
SSF-V-BY-200 SSF-V-BY-400 SSF-V-BY-600	2 50	25 635	31 787	29 737	5 3/8 137	15 9/16 395	119 54	123 56	146 66

# VELAN PIPING KING PACKAGE UNITS

**N-V-BY-150, N-V-BY-300,  
N-V-BY-675, N-V-BY-900,  
N-V-BY-1500, N-V-BY-2500,  
N-V-BY-2600**

## ENGINEERING DATA

TYPE	PRESSURE RANGE psi/bar	ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
<b>N-V-BY-150</b> (1)(2)(3)	0-150 0-10.5	1/2	2,800 1,272
<b>N-V-BY-300</b> (1)(2)(3)	0-300 0-21		12.7
<b>N-V-BY-675</b> (1)(2)(3)	0-675 0-46.5	5/16	2,900 1,315
<b>N-V-BY-900</b> (1)(2)(3)	0-900 0-62	1/4	1,850 8,41
<b>N-V-BY-1500</b> (1)(2)(3)	0-1500 0-103		6.4
<b>N-V-BY-2500</b> (2)	500-2500 34.5-172	5/16	4,800 2,182
<b>N-V-BY-2600</b> (4)	500-2600 34.5-179		8

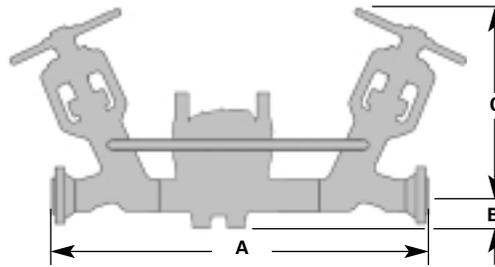
Material and maximum temperature:  
(1) A105/WCB, max. temp. 850°F (454°C) which is permissible, but not recommended for prolonged use above 800°F (426°C).,  
(2) F22, max. temp. 1,050°F (565°C),  
(3) F316, max. temp. 1,000°F (537°C),  
(4) F91, max. temp. 1,100°F (593°C).

**SPF0-V-BY TO SPF7-V-BY  
SP6-V-BY TO SP8-V-BY**

## ENGINEERING DATA

TYPE	PRESSURE RANGE psi/bar	ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
<b>SPF0-V-BY</b> (1)(2)(3)	10-200 0.69-14	7/8	17,000 7,727
<b>SPF1-V-BY</b> (1)(2)(3)	10-350 0.69-24		19,000 8,636
<b>SPF2-V-BY</b> (1)(2)(3)	10-600 0.69-42		22,000 10,000
<b>SPF3-V-BY</b> (1)(2)(3)	10-1500 0.69-103	1 3/8	27,000 12,273
<b>SPF4-V-BY</b> (1)(3)	10-200 0.69-14		38,000 17,272
<b>SPF5-V-BY</b> (1)(3)	10-350 0.69-24		43,000 19,545
<b>SPF6-V-BY</b> (1)(3)	10-600 0.69-42	35	49,000 22,272
<b>SPF7-V-BY</b> (1)(3)	10-1500 0.69-103		63,000 28,636
<b>SP6-V-BY</b> (1)	10-200 0.69-14		90,000 40,909
<b>SP7-V-BY</b> (1)	10-600 0.69-42	2	130,000 59,090
<b>SP8-V-BY</b> (1)	10-1500 0.69-103		160,000 72,727

Material and maximum temperature:  
(1) A105/WCB, max. temp. 850°F (454°C) which is permissible, but not recommended for prolonged use above 800°F (426°C).,  
(2) F22, max. temp. 1,050°F (565°C),  
(3) F316, max. temp. 1,000°F (537°C).

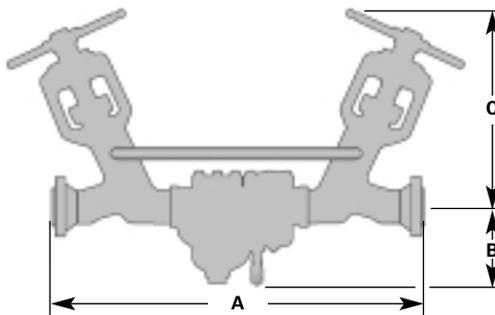


**ALSO AVAILABLE WITH VELAN POWER BALL VALVE:**

- Two isolating valves
- Three bypass valves

## DIMENSIONS & WEIGHTS

TYPE	SIZE in/mm	A Face to Face			B Center to Bottom	C Center to Top	Weight lb/kg		
		SCR/SW	BW	FLG			SCR/SW	BW	FLG
<b>N-V-BY-675</b> <b>N-V-BY-900</b> <b>N-V-BY-1500</b>	1/2	14 1/2	20 1/2	18 1/2	2	7 3/4	36	39	42
	15	368	521	470	50	197	16	18	19
	3/4	15 3/4	21 3/4	20 1/4	2 1/4	8 9/16	57	60	63
	20	400	552	514	57	217	26	27	29
	1	18 5/8	24 5/8	23 1/8	2 11/16	11 1/2	69	72	75
	25	473	625	587	68	292	31	33	34
<b>N-V-BY-2500</b> <b>N-V-BY-2600</b>	1/2	18 1/2	24 1/2	24	2 7/8	9 1/8	96	100	110
	15	470	622	610	73	232	43	45	50
	3/4	21 3/8	27 3/8	26 7/8	3	12 1/4	120	125	140
	20	543	695	683	76	311	54	57	63
	1	24	30	29 1/2	4 1/4	16 1/2	170	175	190
	25	610	762	749	108	419	77	79	86



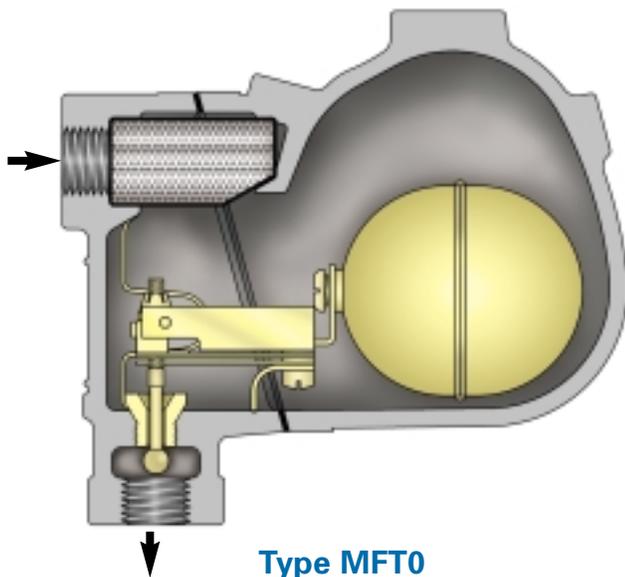
## DIMENSIONS & WEIGHTS

TYPE	SIZE in/mm	A Face to Face			B Center to Bottom	C Center to Top	Weight lb/kg		
		SCR/SW	BW	FLG			SCR/SW	BW	FLG
<b>SPF0-V-BY</b> <b>SPF1-V-BY</b> <b>SPF2-V-BY</b> <b>SPF3-V-BY</b> <sup>(1)</sup>	1	19 1/8	25 1/8	23 1/8 <sup>(1)</sup>	2 11/16	11 1/2	90	93	118
	25	486	638	587	68	292			
	1 1/2	21 3/4	27 3/4	25 3/4 <sup>(1)</sup>	5 3/8	15 9/16			
	40	552	705	654	137	395			
<b>SPF4-V-BY</b> <b>SPF5-V-BY</b> <b>SPF6-V-BY</b> <b>SPF7-V-BY</b> <sup>(2)</sup>	1 1/2	22 3/4	28 3/4	26 3/4 <sup>(2)</sup>	5 3/8	15 9/16	167	170	217
	40	578	730	679	137	395			
	2	24 3/4	30 3/4	28 3/4 <sup>(2)</sup>	5 3/8	16 11/16			
	50	629	781	730	137	424			
<b>SP6-V-BY</b> <b>SP7-V-BY</b> <b>SP8-V-BY</b> <sup>(3)</sup>	2	32	38	36 <sup>(3)</sup>	5 3/8	16 11/16	275	275	286
	50	813	965	914					
	2 1/2	38	38	38 <sup>(3)</sup>					
	65	965	965	965					
	3	38	38	38 <sup>(3)</sup>					
	80	965	965	965					

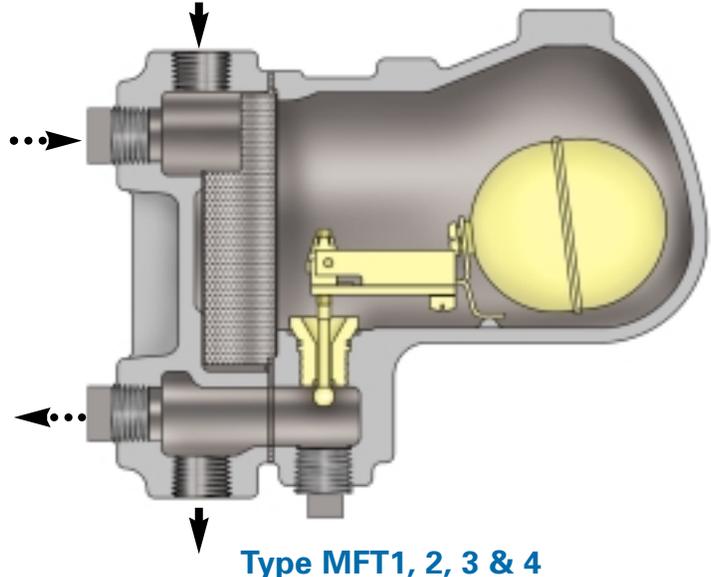
(1) For SPF3-V-BY with Flanged Connection, A (face to face) for 1" is 23 5/8" (600 mm) and for 1 1/2" is 26 1/4" (669 mm).  
(2) For SPF7-V-BY with Flanged Connection, A (face to face) for 1 1/2" is 27 1/4" (692 mm) and for 2" is 31 3/4" (806 mm).  
(3) For SP8-V-BY with Flanged Connection, A (face to face) is 39" (991 mm) for all sizes.

# VELAN MONOVALVE FLOAT BIMETALLIC STEAM TRAPS

**Type MFT/MFTS For Positive Drainage of Unit Heaters & Process Equipment**  
**A Complete Unit: Built-in Strainer, Check Valve,**  
**Air Vent & Optional Bypass Shut-Off**



**Type MFT0**

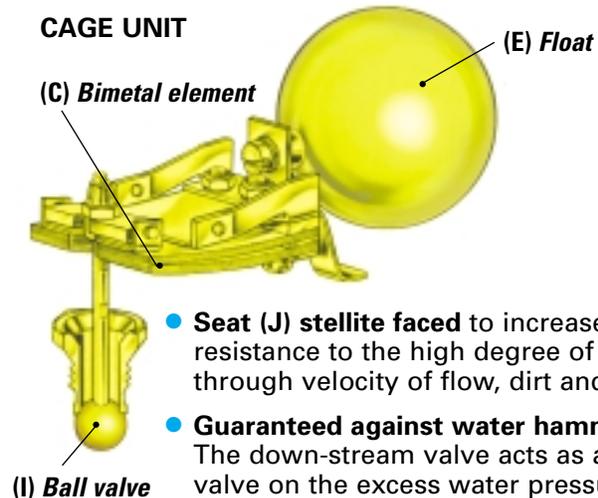


**Type MFT1, 2, 3 & 4**

## TYPE MFT & MFTS DESIGN FEATURES

- **Positive closing and condensate drainage**  
 The bimetallic element is a function of the saturated steam curve (pages 2 and 3) and it's sensitivity to the temperature change assures an immediate reaction to both steam and condensate for the entire pressure range. At saturated steam temperature the valve is closed as on a standard bimetallic steam trap, however, in this type any condensate build-up even at saturated steam temperature is discharged at the same rate. As it reaches the trap, the float becomes buoyant and opens the valve mechanically (see page 5).
- **Stainless Steel Float & Trim**
- **Simple Installation**  
 Multiple inlet and outlet connections facilitate installation.
- **Integral strainer**  
 Stainless steel screens are integral to protect the trap operating mechanism from damage by dirt or scale. No extra fittings or installation costs are required. Free strainer area minimum 5 to 1. Perforation is 0.031" (0.8 mm).
- **Integral check valve operation**  
 The main valve acts as a check valve preventing back flow.
- **Stainless steel pivots**  
 Assure adequate protection against wear.

## CAGE UNIT



- **Seat (J) stellite faced** to increase resistance to the high degree of wear through velocity of flow, dirt and scale.
- **Guaranteed against water hammer.**  
 The down-stream valve acts as a release valve on the excess water pressure without damage to internal parts.
- **Freezeproof installation**  
 without insulation – complete drainage when cold.
- **Other options include:** NPT blow down plug, strainer blowdown valve and Piping King Units.

## APPLICATIONS

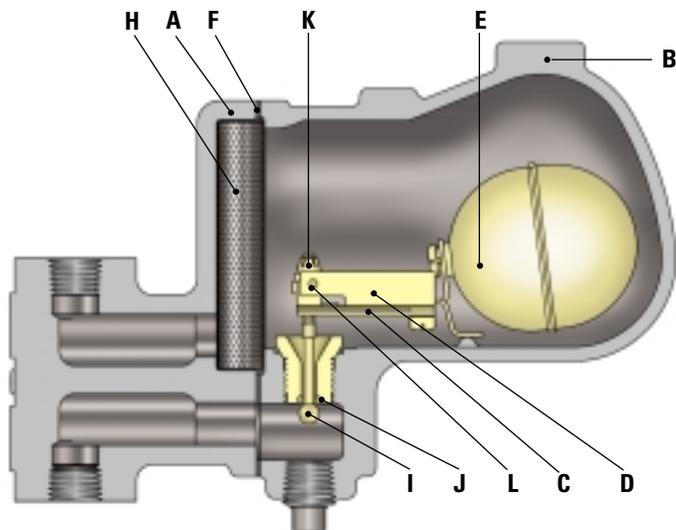
Where positive drainage is essential and condensate back-up cannot be tolerated.

- Unit Heaters, ● Laundry Presses, ● Calorifiers, ● Ironers, ● Calendars, ● Drying Cylinders and other applications where condensate has to be discharged at steam temperature.

# VELAN MONOVALVE FLOAT BIMETALLIC STEAM TRAPS

## CAPACITY

The performance graphs indicate the continuous discharge capacities of condensate per hour at various pressure differentials across the trap.



Type MFT5/MFTS

## STANDARD MATERIALS

PART		MATERIALS	
		MFT0-5	MFTS
A	Body	Cast iron Gr. 220 <sup>(1)</sup>	Cast steel WCB
B	Cover	Same as body material	
C	Bimetal element	Truflex GB-14	
D	Bimetal holder	Stainless steel	
E	Float	Stainless steel	
F	Cover gasket	Stainless steel with non-asbestos filler	
G	Cover screw <sup>(2)</sup>	High tensile steel Gr. S	
H	Strainer	Stainless steel	
I	Stem & ball	Stainless steel, ball 58 Rc	
J	Seat	SS hardfaced with Stellite 6	
K	Self-lock adjusting nut	Stainless steel	
L	Pivot Plug	Stainless steel	

(1) MFT0: Material is Cast Iron Gr. 250.

(2) MFTS: Material is B7.

Note: Part "G" is not shown above for clarity.

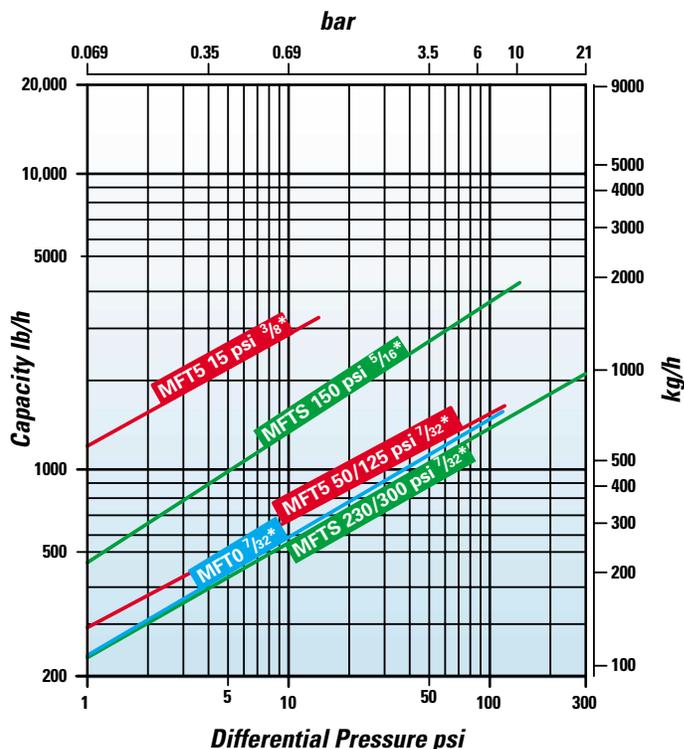
## CONNECTIONS:

MFT0-5: ● Screwed

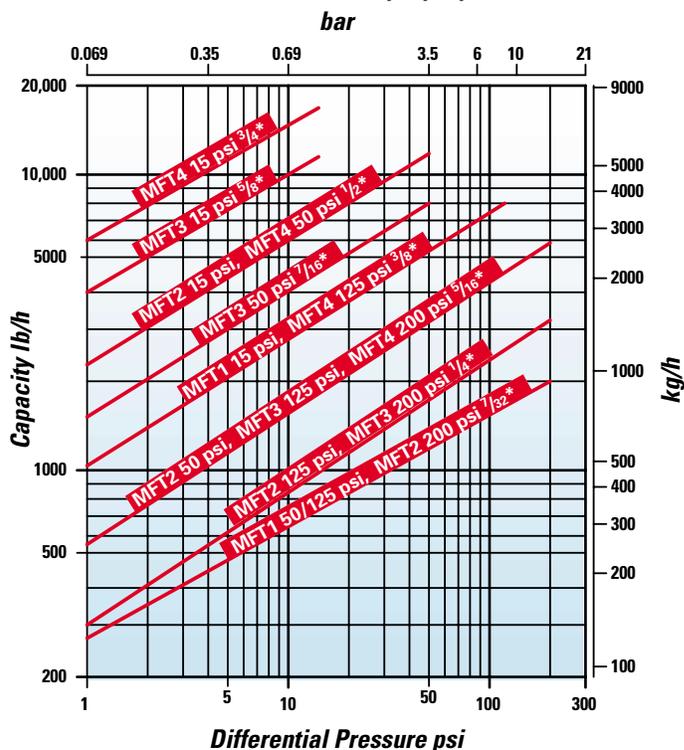
MFTS: ● Screwed ● Socketweld

● Buttweld ● Flanged

## TYPE MFT0, MFTS, MFT5



## TYPE MFT1, 2, 3, 4



\* Fraction represents orifice size.

# VELAN MONOVALVE FLOAT BIMETALLIC STEAM TRAPS

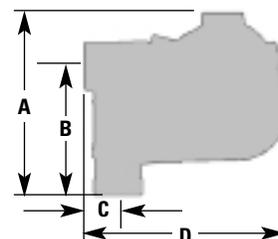
## ENGINEERING DATA

TYPE	PRESSURE RANGE psi/bar	MATERIAL	MAX. TEMP. °F/°C	ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
MFT0	0-125 0-8.5	Cast Iron Gr.250	428 220	7/32 5.5	1,650 750
MFT1	0-15 0-1	Cast Iron Gr.220	428 220	3/8 9.5	3,250 1,477
	0-50 0-3.5			7/32 5.5	1,250 568
MFT2	0-125 0-8.5	Cast Iron Gr.220	428 220	7/32 5.5	1,700 772
	0-15 0-1			1/2 12.7	7,000 3,182
MFT3	0-50 0-3.5	Cast Iron Gr.220	428 220	5/16 8	3,200 1,455
	0-125 0-8.5			1/4 6.4	2,600 1,182
MFT4	0-15 0-1	Cast Iron Gr.220	428 220	7/32 5.5	2,000 909
	0-50 0-3.5			3/4 19	17,500 7,955
MFT5	0-125 0-8.5	Cast Iron Gr.220	428 220	1/2 12.7	12,000 5,455
	0-200 0-14			3/8 9.5	8,000 3,636
MFTS	0-150 0-10.5	Cast Carbon Steel WCB	650 343	5/16 8	4,200 1,909
	0-230 0-16			7/32 5.5	1,900 863
	0-300 0-21			7/32 5.5	2,100 955

Type MFT0



MFT0, Screwed connection only.



## DIMENSIONS & WEIGHTS

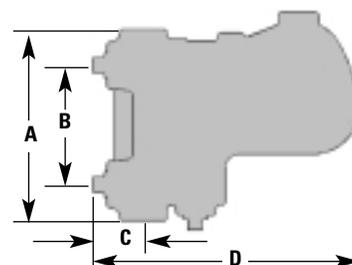
TYPE	SIZE in/mm	A Height	B <sup>(1)</sup> Center to Face	C <sup>(2)</sup> Center to Face	D Length	Weight lb/kg
MFT0	1/2 3/4	6 1/8	4 3/8	1 1/8	6 3/4	8.75
	15 20	156	111	29	171	4

(1) Center of inlet to outlet face. (2) Center of outlet to inlet face.

Type MFT1, 2, 3, & 4



MFT1-4, Screwed connection only.



## DIMENSIONS & WEIGHTS

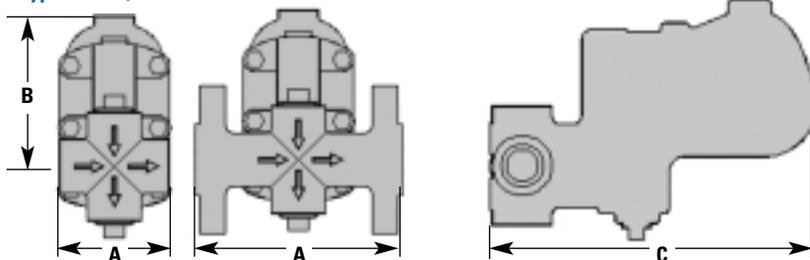
TYPE	SIZE in/mm	A <sup>(1)</sup> Face to Face	B <sup>(2)</sup> Center to Center	C <sup>(3)</sup> Center to Face	D Length	Weight lb/kg
MFT1	1/2 3/4 1	6 5/8	3 15/16	1 3/8	8 5/16	12
	15 20 25	168	100	35	211	5.5
MFT2	3/4 1	7 11/16	4 3/4	1 7/16	9 3/8	15
	20 25	195	121	37	238	7
MFT3	1 1/4 1 1/2	8	4 1/2	1 3/4	10 3/8	17
	32 40	203	114	44	264	8
MFT4	1 1/2 40	9	5 1/2	1 3/4	12 3/4	33
	2 50	229	140	44	324	15
MFT5	2 50	10 1/4	5 5/8	2 1/4	13 1/2	35
	50	260	143	57	343	16
MFTS	2 50	11	6 1/2	2 1/4	14 1/2	51
	50	279	165	57	368	23

(1) Vertical connection. (2) Horizontal connection. (3) Center of vertical outlet to face of horizontal outlet.

MFT5: Screwed connection only.

MFTS:  
Screwed Socketweld  
Buttweld & Flanged connections.

Type MFT5, MFTS



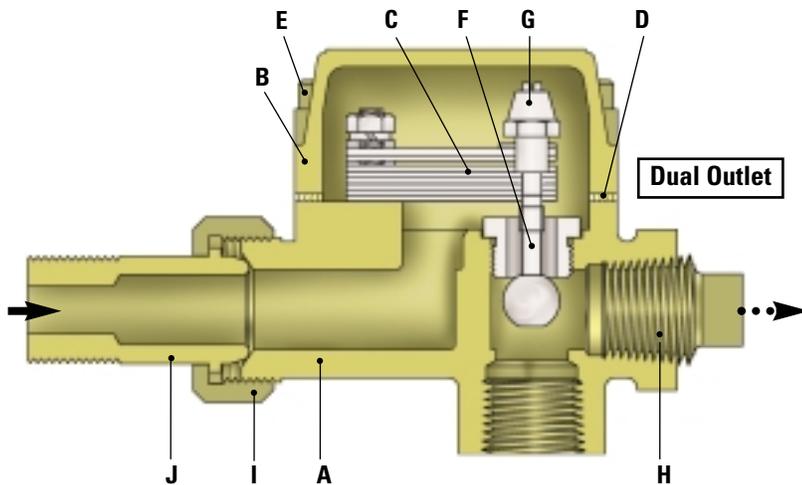
## DIMENSIONS & WEIGHTS

TYPE	SIZE in/mm	A Face to Face			B Center to Top	C Length	Weight lb/kg		
		SCR/SW	BW	FLG			SCR/SW	BW	FLG
MFT5	1/2 3/4 1	3 11/16	N/A	N/A	5 1/4	9 1/4	12	N/A	N/A
	15 20 25	94	N/A	N/A	133	235	5.5	N/A	N/A
MFTS	1/2 3/4 1	3 11/16	9 1/16	6	5 1/4	9 1/4	18	20	30
	15 20 25	94	246	152	133	235	8	9	14



# VELAN SPACE HEATING STEAM TRAPS

## Type ACF Bimetallic Heating Trap For Radiators, Convectors, Low & High Pressure Heating Systems



### STANDARD MATERIALS

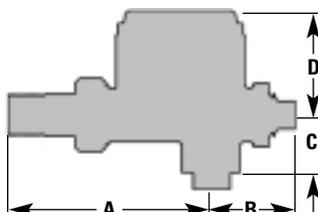
PART	MATERIALS	
A	Body	Brass pressing (CZ122)
B	Cover	Same as body material
C	Bimetal element	Truflex GB-14
D	Cover gasket	Wire reinforced graphite filler
E	Cover bolts	Chrome moly. alloy
F	Stem & ball	Stainless steel
G	Self-lock adjusting nut	Stainless steel
H	Plug	Carbon steel
I	Union nut	Brass
J	Male union	Brass

### DESIGN FEATURES

- **Positive closing.** Every Velan trap closes tightly at saturated steam temperature.
- **Simple Maintenance**  
Operating parts are contained in one easily accessible unit for quick and easy maintenance.
- **Stainless Steel Trim**
- **No bellows** to be damaged by water hammer. An automatic release in Velan traps.
- **Horizontal or vertical installation and dual outlet**
- **Freezeproof installation**  
Velan traps drain completely when cold, and are therefore freezeproof without insulation.
- **Automatic air venting - good discharge capacity**  
Air and cold condensate is discharged through a full orifice efficiently ensuring fast warm-up of equipment.
- **Compact & efficient design.** Operating parts are contained in one unit – quick & easy access.

### APPLICATIONS

- Natural draught convectors, • Steam radiators,
- Hot tables & cupboards, • Small coils, Tea kettles,
- Vacuum systems & Air venting.



### DIMENSIONS & WEIGHTS

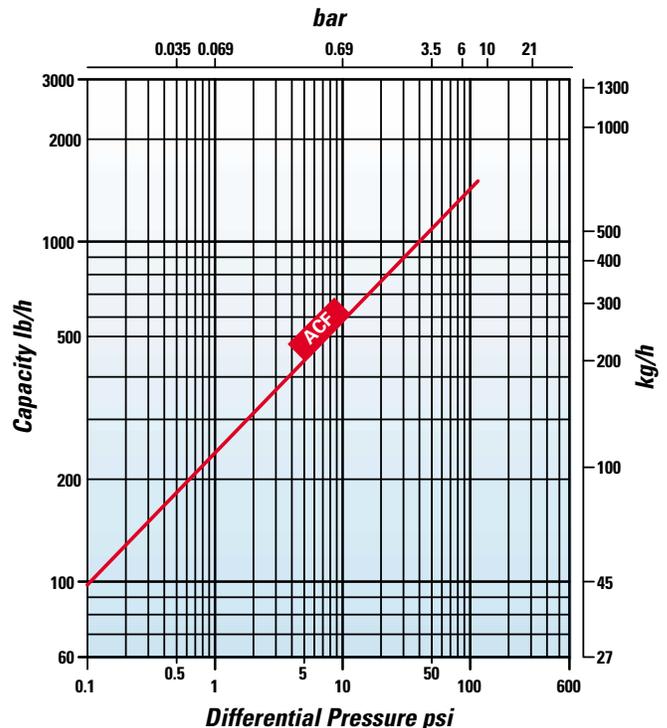
TYPE	SIZE in mm	A Face to Face	B Center to Plug	C Center to Bottom	D Center to Top	Weight lb kg
ACF	1/2 15	3 1/4 83	1 1/8 29	1 1/2 38	2 51	1.5 0.68

### ENGINEERING DATA

PRESSURE RANGE psi/bar	MATERIAL	MAX. TEMP. °F/°C	ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
0-40 0-3	Brass Pressing CZ122	388	3/8	1,000 455
0-120 0-8		198	9.5	1,600 727

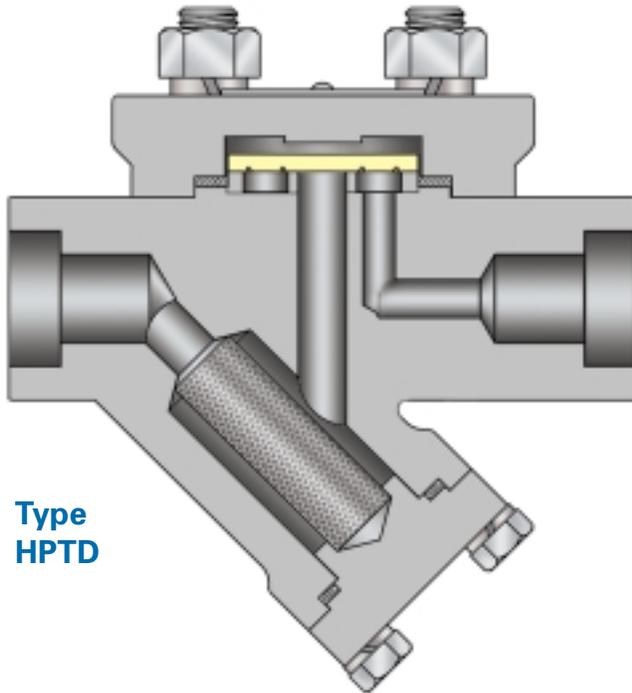
### CAPACITY

The performance graph indicates the continuous discharge capacities of condensate per hour at various pressure differentials across the trap.

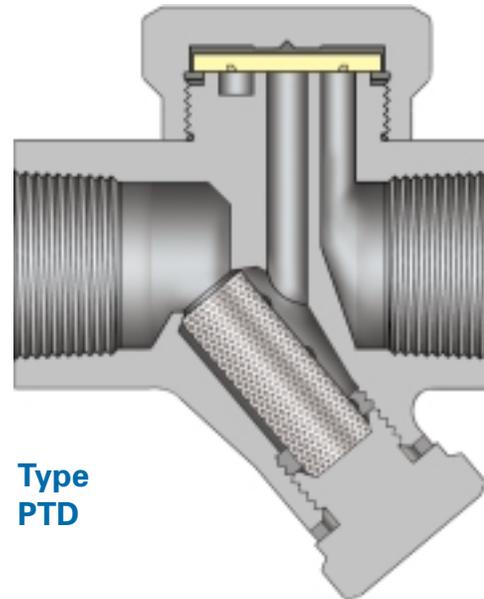


# VELAN THERMODYNAMIC STEAM TRAPS

## Type HPTD, PTD & VTS with Stainless Steel Hardened Floating Disc



Type  
HPTD



Type  
PTD

### TYPE VTS & HPTD DESIGN FEATURES

- **Stainless steel hardened floating disc**, ground and lapped with seat replaceable in line.
- **Gaskets** are spiral wound, stainless steel with graphite. **Trim** is stainless steel
- **Valve seats Stellite**  
Most Velan valve seats are Stellite faced to increase their resistance to the high degree of wear through velocity of flow, dirt and scale.
- **Integral strainer**  
Stainless steel screens are integral in all three models to protect the trap operating mechanism from damage by dirt or scale. No extra fittings or installation costs are required. Free strainer area minimum 5 to 1. Perforation is 0.031" (0.8 mm).
- **Silent operation** – no violent line shocks.
- **Positive closing**  
Every Velan trap closes tightly on saturated steam temperature. Positive closing for long periods on dry superheated steam lines has enormous advantages in power plant and marine service.
- **All-position installation** simplifies piping layout.

- **Freezeproof installation**  
Velan traps do not require a reservoir of priming water in the body to operate when installed vertically with inlet on top, they drain completely when cold, and are therefore freezeproof without insulation.
- **Positive condensate drainage** for process work.
- **Options for HPTD include:** NPT blow down plug or blow-down valve and Piping King Unit.

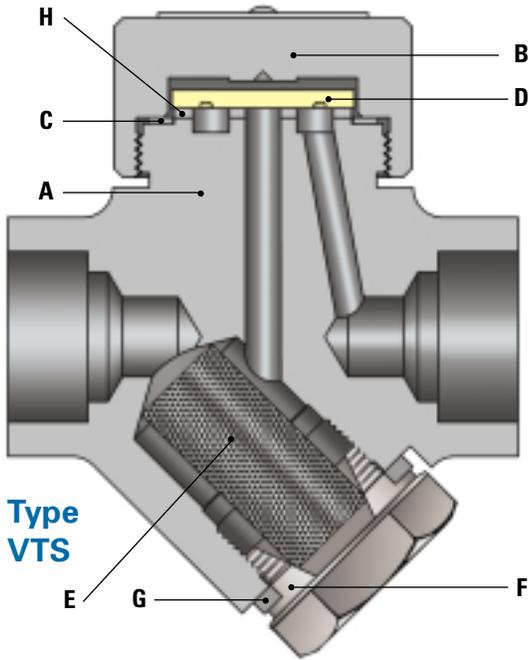
### APPLICATIONS

- **HPTD, PTD & VTS**  
Multi-platen Presses,  
Garment Presses,  
Rubber and Plastic moulding equipment,  
Sterilizers and Laundry Ironers.

### CONNECTIONS:

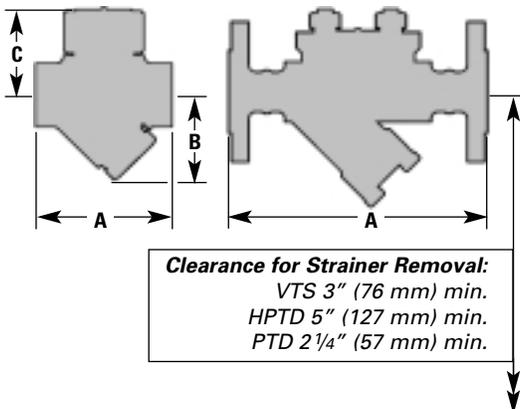
- HPTD & VTS:** ● Screwed ● Socketweld  
● Butt weld ● Flanged
- PTD:** ● Screwed

# VELAN THERMODYNAMIC STEAM TRAPS



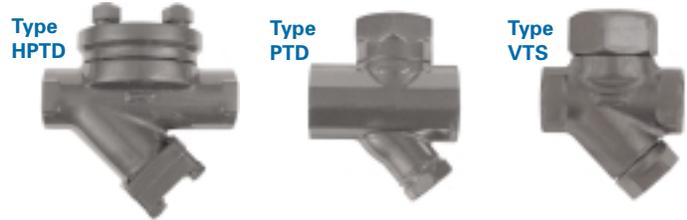
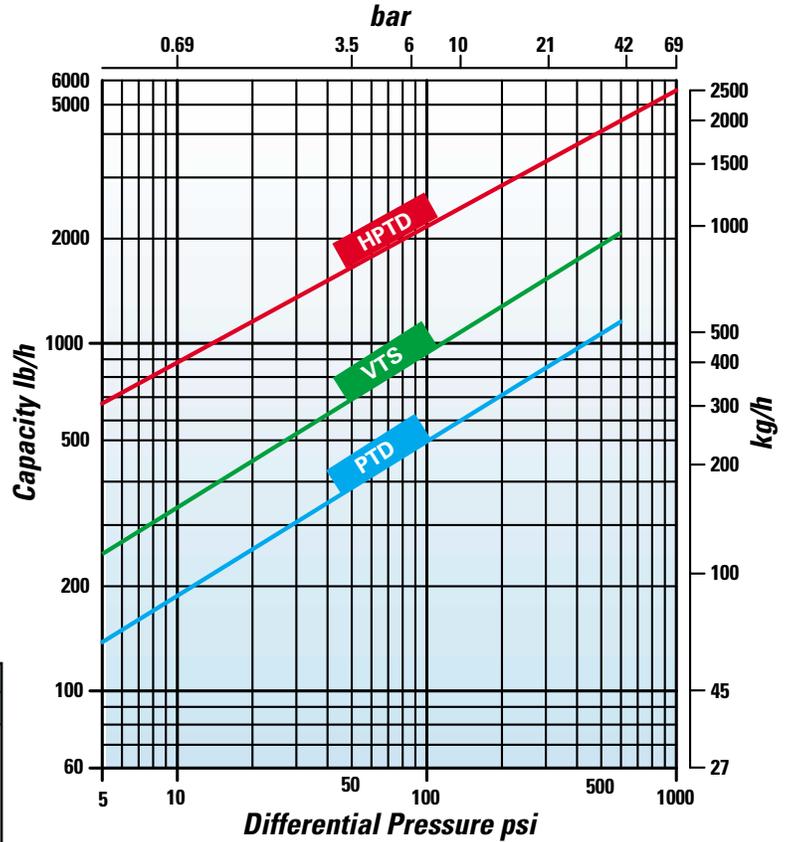
## STANDARD MATERIALS

PART		MATERIALS		
		PTD	VTS	HPTD
A	Body	Cast stainless steel 410	Forged alloy steel F11 Forged stainless steel F316 Forged carbon steel A105	Forged carbon steel A105 [C. Max. 0.25]
B	Cover	SS 316	Same as body material	
C	Cover gasket	-	Monel	SS with graphite filler
D	Floating disc	Stainless steel, hardened		
E	Strainer	Stainless steel		
F	Strainer cover	Same as body material		
G	Strainer cover gasket	Stainless steel	Stainless steel spiral wound with non-asbestos filler	
H	Seat	Hardened	Hardfaced with Stellite 6	



## CAPACITY

The performance graph indicates the continuous discharge capacities of condensate per hour at various pressure differentials across the trap.



## ENGINEERING DATA

TYPE	PRESSURE RANGE psi/bar	MAX. TEMP °F/°C				MAX. CAPACITY lb/h kg/h
		A105	F11	F316	410	
PTD	5-600	-	-	-	650 343	1,210 550
VTS	0.34-41	850 <sup>(1)</sup> 454	1000 538	1000 538	-	2,060 936
HPTD	5-1000 0.34-69	-	-	-	-	5,500 2,500

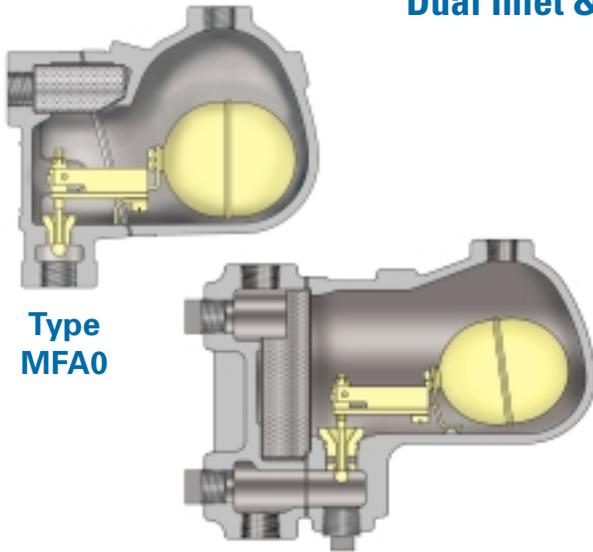
(1) Permissible, but not recommended for prolonged use above 800°F (426°C).

## DIMENSIONS & WEIGHTS

TYPE	SIZE in/mm	A Face to Face			B Center to Bottom	C Center to Top	Weight lb/kg				
		SCR/SW	BW	FLG			SCR/SW	BW	FLG		
		PTD	1/2 15	3/4 20			2 5/8 67	-	-	1 3/4 44	1 9/16 40
VTS	3/8 10	1/2 15	3/4 20	3 3/16 81	9 3/16 233	6 1/4 159	2 1/8 54	2 1	3 1.5	7 3	
HPTD	1/2 15	3/4 20	1 25	6 1/8 155	12 1/8 308	10 1/8 257	4 102	2 7/8 73	18 8	20 9	26 12

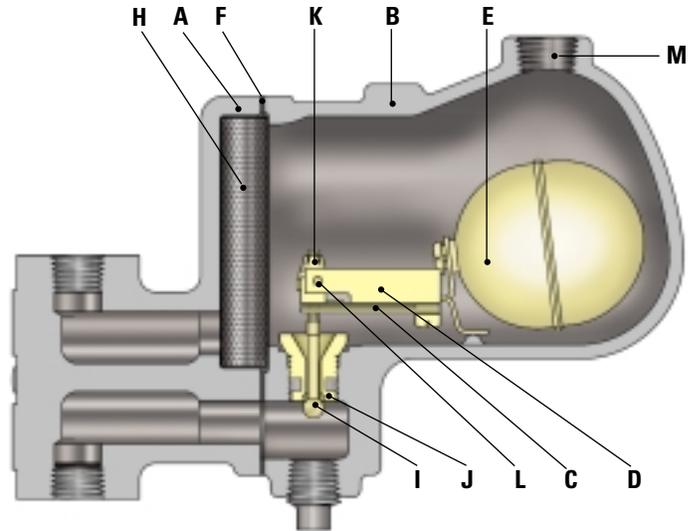
# VELAN COMPRESSED AIR DRAIN TRAPS

## Type MFA/MFAS For Pneumatic Use – Power Tools Blowing Moulds & Paint A Complete Unit: Built-In Strainer, Check Valve & Air Vent with Dual Inlet & Outlet Connections



Type  
MFA0

Type MFA1 & 2



Type MFAS

### COMPRESSED AIR DRAINAGE

In much the same way as steam, but for quite different reasons, compressed air gives up moisture as it cools. The act of compression raises the temperature of the air and even when passed through an after-cooler, it still has heat to loose before reaching the point at which it is used.

Water vapor carried in compressed air condenses and collects in the bottom of receivers, tanks or separators, and in low points of compressed air lines. If such accumulations are not removed, the passing air will pick up moisture, which may cause rusting, sticking or spoiled work.

### TYPE MFA & MFAS DESIGN FEATURES

The Velan Type MFA float trap automatically removes accumulated water from compressed air systems. Construction is similar to the Type MFT Steam Trap except that there is no thermostatic element. A boss is provided on top of the cover, tapped for a  $\frac{3}{8}$ " (10 mm) air circulating pipe which is necessary unless the trap is fitted directly under and so close to the drain point that air entering the trap can escape back through the inlet.

- **Stainless Steel Float & Trim**
- **Simple Installation**  
Multiple inlet and outlet connections facilitate horizontal, vertical or angle installation.

- **Integral strainer**  
Stainless steel screens are integral to protect the trap operating mechanism from damage by dirt or scale. No extra fittings or installation costs are required. Free strainer area minimum 5 to 1. Perforation is 0.031" (0.8 mm).
- **Integral check valve operation**  
The main valve acts as a check valve preventing back flow.
- **Stainless steel pivots**  
Assure adequate protection against wear.
- **Seat Stellite faced**  
to increase resistance to the high degree of wear through velocity of flow, dirt and scale.
- **Freezeproof installation**  
Freezeproof without insulation  
– complete drainage when cold.

### APPLICATIONS

Pneumatic power tool operation:

- Air operated chucks,
- Air operated cutters

Pneumatic blowing operation:

- Foundry mould blowing,
- Paint shop spraying

# VELAN COMPRESSED AIR DRAIN TRAPS

## STANDARD MATERIALS

PART		MATERIALS	
		MFA-0,1,2	MFA-S
A	Body	Cast iron Gr. 220 <sup>(1)</sup>	Cast steel WCB
B	Cover	Same as body material	
C	Plate	Stainless steel 1/8" thick	
D	Holder	Stainless steel	
E	Float	Stainless steel	
F	Cover gasket	Stainless steel with non-asbestos filler	
G	Cover screw	High tensile steel Gr. S	
H	Strainer	Stainless steel	
I	Stem & ball	Stainless steel	
J	Seat <sup>(2)</sup>	SS hardfaced with Stellite 6	
K	Self-lock adjusting nut	Stainless steel	
L	Pivot Plug	Stainless steel	
M	Connection for balance pipe	3/8" NPT	

(1) Cast Iron Gr. 250 for MFA0 (2) MFA0: hardened seat.

## ENGINEERING DATA

TYPE	PRESSURE RANGE psi/bar	MATERIAL	MAX. TEMP. °F/°C	ORIFICE in/mm	MAX. CAPACITY lb/h kg/h
MFA0	0-125	Cast Iron Gr.250	428 220	7/32 5.5	4,500 2,045
MFA1	0-8.5				4,500 2,045
MFA2	0-200 0-14	Cast Carbon Steel	650 343		6,000 2,727
MFAS	0-150 0-10.5				3,000 1,364
	0-230 0-16	3,500 1,590			
	0-300 0-21	4,000 1,818			

MFA0, 1, 2: Screwed connection only.  
MFAS: Screwed, Socketweld,  
Buttweld & Flanged connections.

## DIMENSIONS & WEIGHTS

TYPE	SIZE in/mm	A Height	B <sup>(1)</sup> Center to Face	C <sup>(2)</sup> Center to Face	D Length	Weight lb/kg
MFA0	1/2	6 1/8	4 3/8	1 1/8	6 3/4	8.75
	3/4	156	111	29	171	4

(1) Center of inlet to outlet face. (2) Center of outlet to inlet face.

TYPE	SIZE in/mm	A <sup>(1)</sup> Face to Face	B <sup>(2)</sup> Center to Center	C <sup>(3)</sup> Center to Face	D Length	Weight lb/kg
MFA1	1/2	6 5/8	3 15/16	1 3/8	8 5/16	12
	3/4	168	100	35	211	5.5
MFA2	1/2	7 11/16	4 3/4	1 7/16	9 3/8	15
	3/4	195	121	37	238	7
MFA2	1 1/4	8	4 1/2	1 3/4	10 3/8	17
	1 1/2	203	114	44	264	8

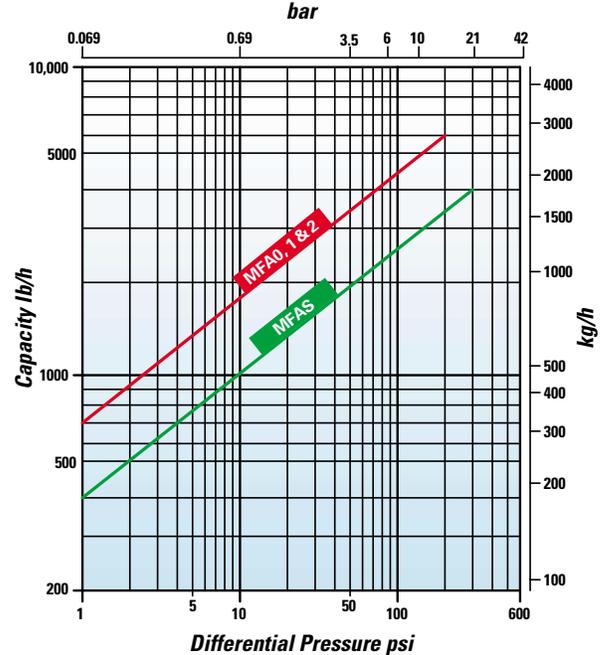
(1) Vertical connection. (2) Horizontal connection.  
(3) Center of vertical outlet to face of horizontal outlet.

TYPE	SIZE in/mm	A Face to Face			B Center to Top	C Overall Length	Weight lb/kg		
		SCR/SW	BW	FLG			SCR/SW	BW	FLG
MFAS	1/2	3 11/16	9 11/16	6	5 1/4	9 1/4	18	20	30
	3/4	94	246	152	133	235	8	9	14
	1								

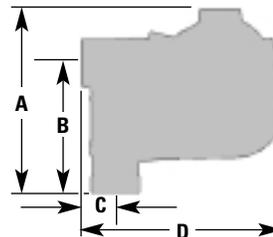
## CAPACITY

The performance graph indicates the continuous discharge capacities of condensate per hour at various pressure differentials across the trap.

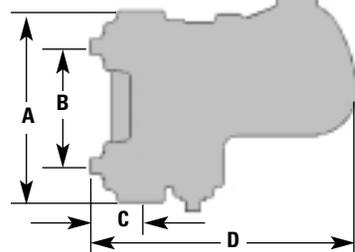
## TYPE MFA0, 1, 2 & MFAS



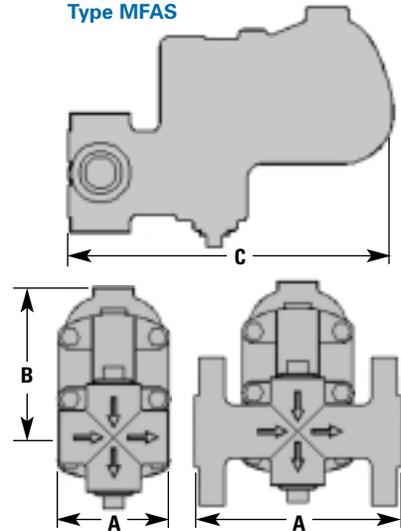
Type MFA0



Type MFA1, 2



Type MFAS



# INCLINED STRAINERS

## DESIGN FEATURES

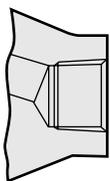
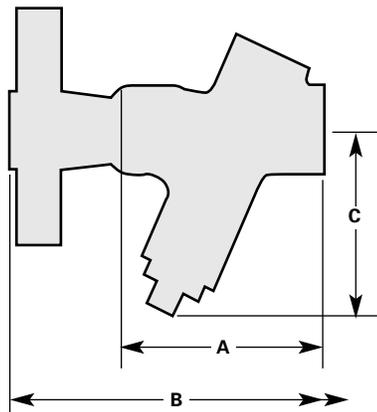
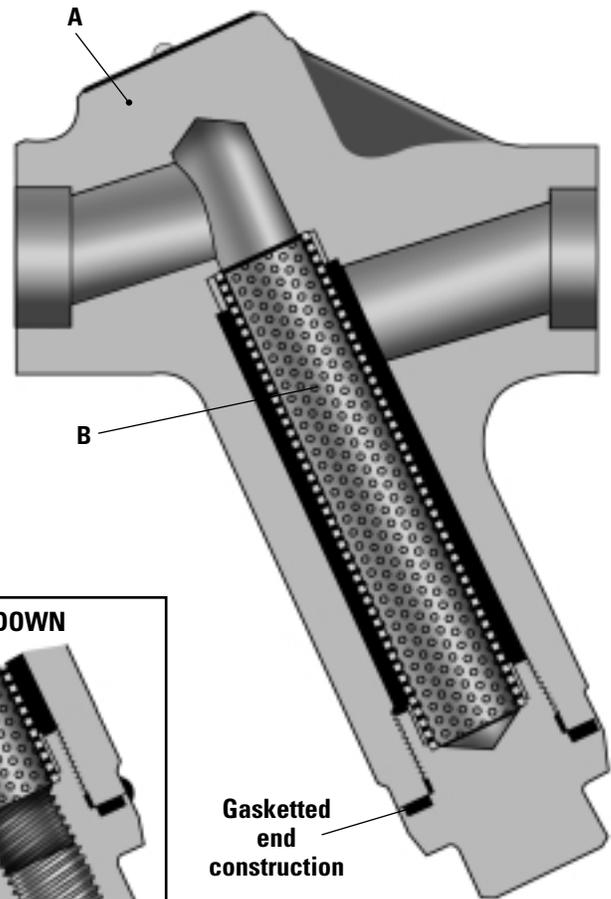
- **Forged body (A)**  
offers the advantages of high strength, structural integrity and reliability that make it an ideal choice for steam service.
- **Stainless steel screen (B)**  
can withstand severe abrasive service and is carefully fitted to prevent leakage between the screen and body.

Screens are normally supplied in stainless steel with 0.031" (0.8 mm) holes (26% free area) and are also available in F22.

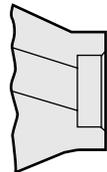
- **Easy internal maintenance**  
Strainers are extremely easy to clean. They may be blown down by simply removing the optional blow down plug or via a suitable valve fitted in its place.

## APPLICATIONS

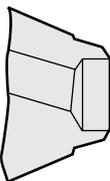
Velan strainers protect steam traps, pumps, temperature and pressure regulators, gauges, instruments, air motors and other equipment from dirt, scale and other debris.



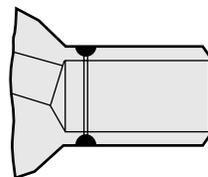
Screwed ends



Socketweld ends



Buttweld ends



Buttweld ends with stub

## DIMENSIONS & WEIGHTS

SIZE in mm	A Face to Face				B Butt Weld (stubs) & FLANGED		C Center to Bottom	
	SCR/SW		BW <sup>(1)</sup>		1500	2500	1500	2500
	1500	2500	1500	2500				
1/2 15	3 5/8 92	4 1/4 108	3 5/8 92	4 1/4 108	8 1/2 216	10 3/8 264	5 127	5 127
3/4 20	4 1/4 108	4 1/4 108	4 1/4 108	4 1/4 108	9 229	10 3/4 273	5 3/8 136	5 3/4 146
1 25	5 11/16 144	5 5/16 135	5 11/16 144	5 5/16 135	10 254	12 1/8 308	7 178	
1 1/4 32	7 178		6 1/4 159	7 178	11 297	13 3/4 349	8 1/2 216	
1 1/2 32	7 178		6 3/4 171	7 178	12 305	15 1/8 384	8 1/2 216	
2 50	8 203		8 203	8 203	14 1/2 368	17 3/4 451	12 1/2 318	

(1) These butt weld dimensions do not comply with ASME/ANSI B16.10 (BS 2080). Velan reserves the right to vary specification from time to time.

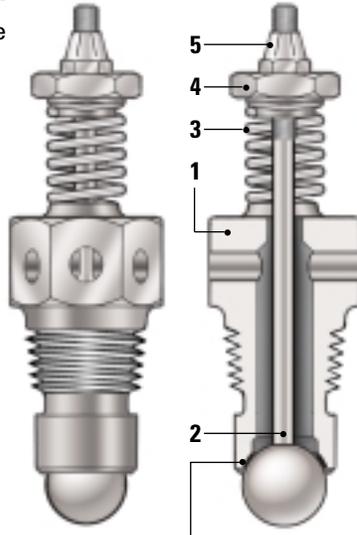
# ACCESSORIES

## VACUUM BREAKERS

Vacuum breakers should be installed wherever vacuum is created in pipelines or other equipment to ensure trouble free operation such as in heating coils for uninterrupted production and elimination of freezing.

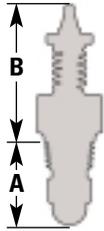
The units are factory set to operate at 5 inHg (mercury) (0.17 bar) vacuum but can easily be reset to suit plant conditions.

Other applications include: unit heaters, cooking kettles, blast coils and air-conditioning equipment.



Seating face hardfaced with Stellite 6 and lapped with ball.

### ENGINEERING DATA



SIZE NPT Thread in/mm	Orifice in/mm	A in/mm	B in/mm	WEIGHT oz/g
1/2 15	1/2 13	1 1/2 38	2 3/8 60	4 112
3/4 20	5/8 16	1 11/16 43	2 3/4 70	8 224
1 25	3/4 19	2 3/16 56	2 3/4 70	11 308

### STANDARD MATERIALS

PART	MATERIALS	SPECIFICATION
1 Body	Stainless steel	BS 970-410S21
2 Stem and ball	Stainless steel	Stem: BS 970-410S21 Ball: AISI 440C
3 Compression spring	Stainless steel	BS 970-303S21
4 Adjusting nut	Stainless steel	BS 970-410S21
5 Self locking nut	Stainless steel	BS 970-304S15

## THERMOMETER

The Velan Thermometer is actuated by a bimetallic helix shaped strip, which is enclosed in stainless steel. Its strong design will withstand adverse conditions and combines reliability with accuracy. The thermometer can be recalibrated on the spot and can be supplied with the following scales and ranges of operation:

**32°F – 572°F (0°C – 300°C)**

Case diameter: 1 3/4" (45 mm)  
Length: 1 1/2" (38 mm)  
Screwed Connection: 1/4" NPT

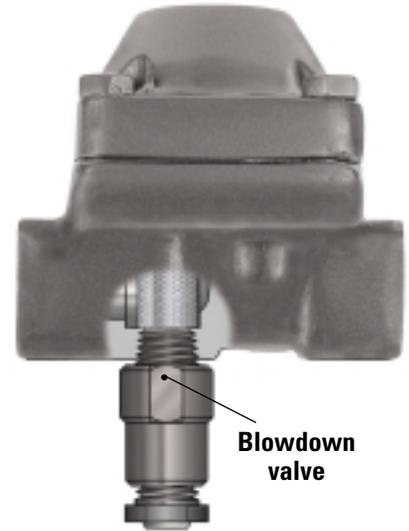
**32°F – 932°F (0°C – 500°C)**

Case diameter: 2 3/4" (70 mm) Length: 3 3/4" (95 mm)  
Screwed Connection: 1/4" NPT



## STRAINER BLOWDOWN VALVE

A rugged stainless steel blowdown valve can be installed below the strainer in Velan Steam Traps as an optional extra. Body and valve are both stainless steel hardened. A forged steel globe, stop or needle valve can be fitted for high pressure operation or where greater integrity is required.



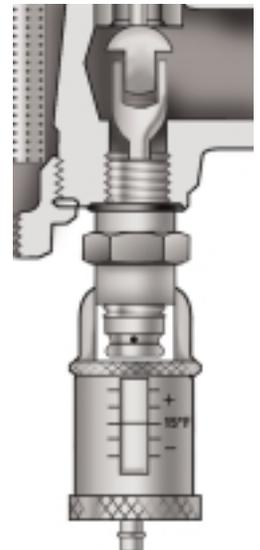
### Connections:

Inlet: 3/8" (10 mm) male screwed BSP or NPT  
Outlet: 1/8" (3 mm) female screwed BSP or NPT

## TEMPERATURE CONTROLLER AVAILABLE FOR SSF, SPF, SF & SP

Velan Steam Traps are factory set to discharge condensate below saturated steam temperature, to save energy up to 30% and no further adjustment is required provided the trap is properly selected based on capacity. To change the discharge temperature you must turn the regulating nut of the temperature controller towards the bottom of the trap to increase the differential temperature or away from the bottom of the trap to decrease the differential temperature. The movement of the regulating nut is transferred directly without friction to the trap valve and the free movement of the valve is increased or decreased accordingly. The result of the setting can be determined by checking the condensate's temperature with a Velan thermometer installed on the trap. Other uses for the temperature controller are:

- Excessive back pressure can be compensated for by turning the controller away from the trap bottom.
- If condensate is backed up, a faster rate of discharge is obtained by turning the controller away from the trap bottom, increasing the valve clearance.
- If the trap leaks steam, and the seating faces are not dirty or damaged, turning the controller towards the trap bottom will reduce the valve clearance thus slowing the trap response time, preventing steam loss.

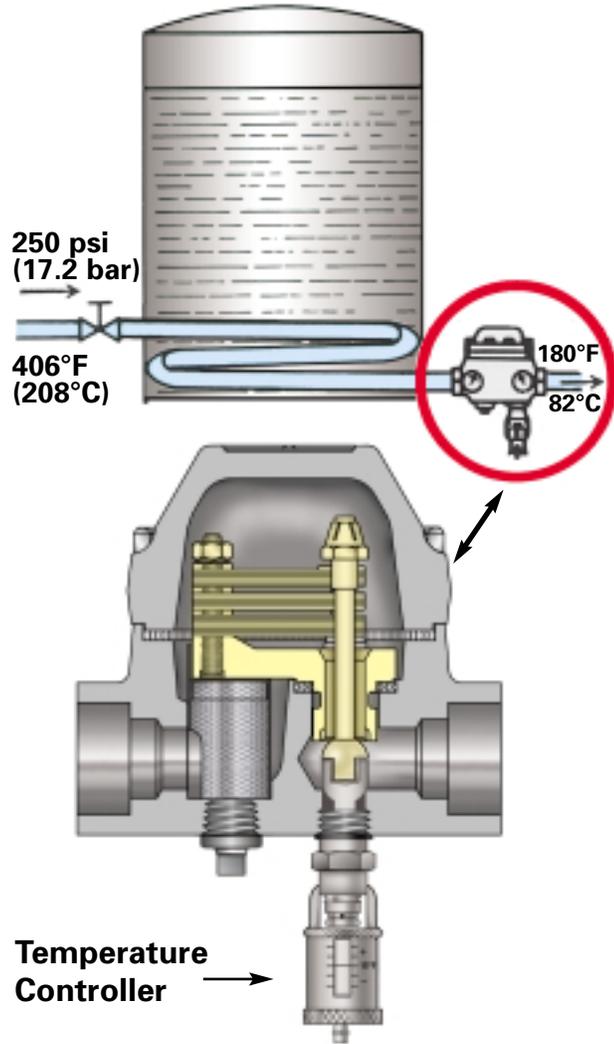


# VELAN STEAM TRAPS

# SAVE UP TO 30% ENERGY

\*Thermal Units are in Btu/lb (kcal/kg)

**Typical Example:**  
**Oil Storage Tank Heating Coil**  
**Required Heat Input:**  
 2,000,000 Btu/h (504,000 kcal/h)  
**Steam Supply:**  
 250 psi/406°F (17.2 bar/208°C)



## ENERGY (STEAM) INPUT Using Conventional Bucket, Float, Thermodynamic and Bellows Traps

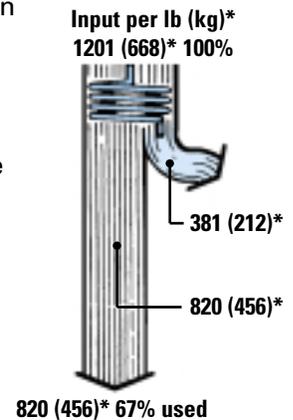
Condensate is discharged as soon as it forms. The latent heat is extracted which, in our example, is 820 (456)\* per pound of condensate. Most of the sensible heat contained in the condensate 381.5 (212)\* or 32% is wasted.

### STEAM DEMAND

$$= \frac{2,000,000 \text{ Btu/h}}{820 \text{ Btu/lb}} = 2,440 \text{ lb/h of Steam}$$

$$\text{or}$$

$$= \frac{504,000 \text{ kcal/h}}{456 \text{ kcal/kg}} = 1,105 \text{ kg/h of Steam}$$



## ENERGY (STEAM) INPUT Using Velan Bimetallic Traps

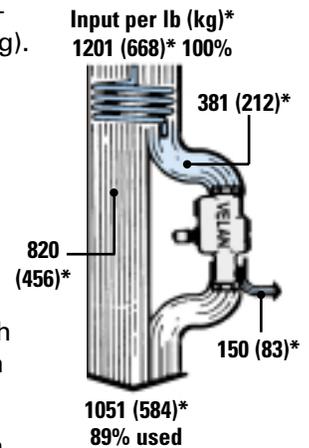
When using Velan Bimetallic Steam Traps the discharge temperature of condensate is adjusted by a temperature controller and most of the sensible heat in the condensate is saved. Condensate is discharged at 180°F (82°C). 231.5 (129)\* [381.5-150 (212-83)\*] are available to re-evaporate part of lodged condensate 820 (456)\* required per lb (kg). 231.5 (129)\* will evaporate 29% into live steam. Heat is transferred to the oil efficiently and the heating process with high pressure condensate approaches heating with live steam.

### STEAM DEMAND

$$= \frac{2,000,000 \text{ Btu/h}}{(820 + 231.5) \text{ Btu/lb}} = 1,900 \text{ lb/h of Steam}$$

$$\text{or}$$

$$= \frac{504,000 \text{ kcal/h}}{(456 + 129) \text{ kcal/kg}} = 861 \text{ kg/h of Steam}$$



## VELAN SAVINGS

### STEAM SAVINGS

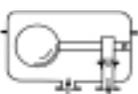
540 lb/h (244kg/h) [2,440-1,900 or 22% (1,105-861 or 22%)] 4,730,400 lb/year  
 9,460 US \$ /year (at 2 US \$ for 1000 lb (455 kg) of Steam)

Submit your steam trapping systems to Velan for free energy savings analysis

# COMPARISON OF PRINCIPLES OF OPERATION

## What design features to look for when selecting a steam trap

### FACTS FOR ESTIMATING TRAP VALUE

	<b>Velan Universal</b> 	<b>Thermostatic</b> 	<b>Float</b> 	<b>Bucket</b> 	<b>Thermodynamic</b> 
<b>Discharge valve actuated by:</b>	Heat of steam closes valve. Pressure opens valve when condensate cools down.	Only by heat.	Buoyancy and weight of float.	Closed by steam pressure. Opened by bucket weight and high levelage.	Closed by flow of hot condensate flashing into vapor. Opened by flow of cold condensate, no flashing.
<b>Perfect discharge when:</b>	Condensate cools down	Selected trap size exactly conforms with working pressure and capacity.	Selected trap size exactly conforms with working pressure and capacity.	Selected trap size exactly conforms with working pressure and capacity.	Condensate temperature low.
<b>Trap selection:</b>	Universal sizes with large range	According to capacity and temperature.	Certain after trial only due to small adaptability to pressure and capacity variations.	Certain after trial only due to small adaptability to pressure and capacity variations.	According to capacity and temperature.
<b>Incorrect selection effects:</b>	Universal sizes	Low discharge capacity.	Steam loss. No flow or continuous flow.	Steam loss. No flow or continuous flow.	Low discharge capacity.
<b>Adjusting facilities for changed conditions:</b>	The only trap adjustable for specific conditions. No change of parts required	None. New size required	None. New size or type required. New valve orifice eventually.	None. New size or type required. New valve orifice eventually.	None. New size or type required.
<b>Ability for air elimination:</b>	Automatically with full trap capacity. No additional valve	Automatic air elimination. No additional valve	None. Additional cost for air-bypass valve and its installation	Small. Extra cost for auxiliary air-bypass valve	Automatically. No additional check valve
<b>Ability to handle cold initial peakloads:</b>	Automatic cold water discharge with full capacity	Automatic cold condensate discharge	Intermittent discharge causes shocks	Automatic cold condensate discharge	Automatic cold condensate discharge
<b>Ability to handle ordinary sediment and sludge, dirt conditions:</b>	Integral strainer in all units. Low first cost and cheapest installation	None. Extra cost for strainer, additional fittings and installation	None. Extra cost for strainer additional fittings and installation	None. Extra cost for strainer. Clogging of bucket hole results in steam waste.	None. Extra cost for strainer and its installation
<b>Absence of strainer often causes:</b>	Integral strainer in all units	Smaller flow. Steam loss. Dirt getting into working parts and orifice.	Smaller flow. Steam loss. Dirt getting into working parts and orifice.	No flow. Buckets vent plugged or trap filled with dirt. Steam waste.	No flow. Continuous flow. Steam waste. Dirt, scale clogging seats and valve orifice.
<b>Ability to handle pressure variations:</b>	Good as bimetal follows saturated steam curve	Good as bellow function of saturated steam	Small. Pressure high: no flow. New valve orifice for raised pressure	Small. Pressure high: no flow. New valve orifice for raised pressure	Good. Depending on condensate temperature
<b>Ability to handle variations in load:</b>	Good due to oversized orifice	Depending on size of trap	Small. Continuous discharge of trap too small.	Small. Continuous discharge of trap too small.	Depending on size of trap
<b>Ability to close valve on hot water only to prevent steam loss:</b>	Yes. If required for 100% steam loss proof operation. Adjustability by temperature controller (optional)	Small	None	None	Small
<b>Ability to handle back pressure:</b>	Patented discharge valve operates as check valve. No extra cost for separate check valve involved	None. Extra cost for check valve, additional fittings and their installation	None. Extra cost for check valve. Steam loss if sudden or frequent frequent drop in pressure.	None. Extra cost for check valve. Steam loss if sudden or frequent frequent drop in pressure.	None. Extra cost for check valve. Steam loss if sudden or frequent frequent drop in pressure.
<b>Installation position:</b>	The only all-position straight way type	Only one position. Additional cost for fitting.	Only horizontal. Not suitable for marine service (float). Costly piping	Only vertical. Costly piping. Not suitable for marine service (float)	Only horizontal. Costly piping
<b>Installation cost:</b>	Lowest. Installed directly in pipe line without fittings. Integral strainer, check valve, air-bypass.	High additional cost for strainer, check valve.	High. Extra cost for additional fittings, strainer, check valve, air vent.	High. Extra cost for additional fittings, strainer, check valve, air vent.	Fair. Extra cost for
<b>Maintenance Cost:</b>	Lowest. One size interchangeable. all over the plant. No fittings. Considerably reduced spare parts stock. Element cheap.	High. Many sizes, large stock of spare parts, fittings. Short life of flexible element.	High. Many sizes, large stock of spare parts, fittings. Short life of valve due to shocks.	Fair. Many sizes. Large stock of spare parts, fittings.	Fair. Many sizes. Large stock of spare parts, fittings. Delicate valve
<b>Size, weight:</b>	Small, light weight	Fair	Large, heavy. Weight up to 80 lb (36 kg)	Medium. For high capacity weight up to 80 lb (36 kg)	Fair
<b>Freezeproof operation:</b>	100% freezeproof in vertical position. Valve widely open.	Special types. Not when trap fails and closes valve.	None	None	Yes
<b>Ability to control temperature in heat process:</b>	Automatic temperature control for specific requirements; optional	None	Precautions necessary.	Precautions necessary.	None
<b>Superheated steam:</b>	Highly recommended up to 1100°F (593°C). Valve tightly closed or high temperature.	Good only up to 500°F (260°C). Expensive stainless steel bellows.	Fair. Danger of re-evaporation body-water and tremendous loss of steam.	Fair. Danger of re-evaporation of body-water and tremendous loss of steam.	Fair but always small steam escapes.

NOTE: The information on this page is general in nature and not intended to show the exact design or performance of any specific manufacturer. The technical comparisons are not intended to downgrade other trap types but to compare their features and operating principles with the Velan Steam Trap.

# SELECTION – SIZING

## DETERMINING THE CAPACITY OF STEAM TRAPS

To determine the discharge capacity of steam traps, the following factors must be taken into consideration:

- **Pressure differential between inlet and outlet**
- **Diameter of orifice**
- **Discharge temperature of condensate**

The condensate capacity charts given for each type are based on tests under working conditions and represent the actual maximum performance with condensate at 40°F (22°C) below saturated steam temperature, which is the standard setting.

Traps will normally commence opening at 15°F (8°C) below saturated steam temperature, but this can be varied if required.

If the condensate is cooler, when starting up from cold for instance, the capacities will be increased considerably. A small increase in the setting of the trap will result in a closer temperature differential and an increase in capacity.

A decrease in setting will provide an element of temperature control, discharging cooler condensate at predetermined temperatures, with reduced flow rates.

## HOW TO SELECT THE SIZE AND TYPE OF TRAP FOR A GIVEN DUTY

Calculate or estimate the maximum amount of steam condensate in lb/h or kg/h and multiply by the appropriate safety factor shown in the **Table of Safety Factors** (see bottom page 33).

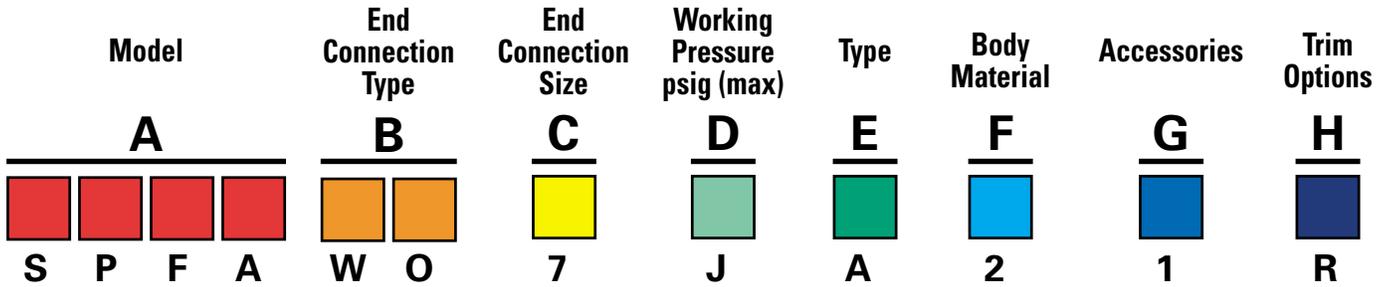
Ascertain the minimum pressure at the trapping point and the maximum pressure liable to occur at the outlet side of the trap. The difference of these two gives the Pressure Differential.

**There are four possible arrangements for the trap, with corresponding variations in the Pressure Differential (Example: with steam at 20 psi (1.38 bar)):**

		Imperial	Metric
<b>(A) Trap discharging to atmosphere:</b>			
Pressure on outlet of trap		0	0
The Pressure Differential	=	20 psi	1.38 bar
<b>(B) Trap discharging into a closed return main</b>			
with a positive backpressure of		5 psi	0.34 bar
Pressure at trap outlet		20 - 5 psi	1.38 - 0.34 bar
The Pressure Differential	=	15 psi	1.04 bar
<b>(C) Trap discharging into overhead return main, open to atmosphere, 6ft (1.8m)</b>			
above the trap. The condensate therefore has to be lifted and causes a back pressure			
of approximately 1 psi for every 2 ft of lift (0.11 bar per meter).			
		20 - $\frac{6}{2}$	1.39 - 0.11 x 1.8
		20 - 3	1.38 - 0.198
The Pressure Differential	=	17 psi	1.18 bar
<b>(D) Trap discharge into a vacuum, such as a condenser.</b>			
In this case, as the trap pressure is above atmospheric pressure the condenser pressure must be			
added to obtain the Pressure Differential. Condenser pressures normally are given by vacuum			
gauges in inches of mercury (inHg) and/or bar. When calculating in imperial units the inHg should			
be converted to psi as follows: 2 inHg corresponds to approximately 1 psi.			
If the vacuum gauge reads 16 inHg (-0.54 bar):			
		20 + $\frac{16}{2}$	1.38 + 0.54
		20 + 8	+1.92 bar
The Pressure Differential	=	28 psi	

Having calculated the Pressure Differential refer to the individual Performance Charts and select a trap suitable for the estimated discharge at the Pressure Differential.

# HOW TO ORDER



**Above example:** SPFA (0, 1, 2 & 3), 1½" socket weld connection, maximum 350 psig, in carbon steel, with temperature controller, and Truflex trim.

The figure numbers shown on this key are designed to cover essential features of Velan Steam Traps. Please use figure numbers to ensure prompt and accurate processing of your order. A detailed description must accompany any special orders.

A MODEL		
ACFO - ACF	MFA5 - MFA5	TS00 - TS
HPTD - HPTD	MFT5 - MFT5	TSFO - TSF
MFT0 - MFT0	MFAS - MFAS	VB00 - Vacuum Breaker
MFT1 - MFT1	NO00 - N	VTSO - VTS
MFT2 - MFT2	PT00 - PT	
MFT3 - MFT3	Q000 - Q	
MFT4 - MFT4	SFO0 - SF	
MFT5 - MFT5	SSFO - SSF	
MFA0 - MFA0	SPFA - SPF 0, 1, 2 & 3	
MFA1 - MFA1	SPFB - SPF 4, 5, 6 & 7	
MFA2 - MFA2	SPO0 - SP 6, 7 & 8	

B END CONNECTION TYPE		
<b>BUTTWELD:</b>	<b>FLANGED:</b>	<b>FLANGED:</b>
AO - SCH.40	(Raised Face)	FJ - BST "A"
BO - SCH.80	FA - ASME 150	FK - BST "D"
CO - SCH.160	FB - ASME 300	FL - BST "E"
DO - Combination Ends	FC - ASME 600	FM - BST "F"
WO - Socket Weld	FD - ASME 1500	FN - BST "H"
XO - Special Ends	FE - ASME 2500	FO - BST "J"
	FF - PN 10/16	FP - BST "K"
	FG - PN 25/40	FQ - BST "R"
<b>SCREWED:</b>	FH - PN 64	FR - BST "S"
NO - NPT	FI - PN 100	FS - BST "T"
SO - BSPP		FX - Special
TO - BSPT		

C END CONNECTION SIZE			
0 - Special	3 - ½" (15 mm)	6 - ¼" (32 mm)	9 - 2½" (65 mm)
1 - ¼" (8 mm)	4 - ¾" (20 mm)	7 - 1½" (40 mm)	10 - 3" (80 mm)
2 - ¾" (10 mm)	5 - 1" (25 mm)	8 - 2" (50 mm)	

D WORKING PRESSURE psig (maximum)			
A - 15	G - 200	N - 2500	U - 230
B - 25	H - 300	P - 40	V - 485
C - 50	J - 350	Q - 120	W - 1000
D - 100	K - 400	R - 250	X - Special
E - 125	L - 600	S - 900	Y - 30
F - 150	M - 1500	T - 675	Z - 2600

E TYPE	
A - Steam Traps	F - Vacuum Breaker
B - Trap with Integral Bypass	G - Freeze Protector
C - Piping King (No Bypass)	H - Piping King (Isolating Valve)
D - Piping King (with Bypass)	X - Special
E - Air Trap	

F BODY MATERIAL	
1 - Special	6 - Chr. Moly., Alloy Steel, F22/WC9
2 - Carbon Steel, A105/WCB	7 - Cast Iron
4 - Chr. Moly., Alloy Steel, F91/C12A	8 - Bronze
5 - Chr. Moly., Alloy Steel, F11/WC6	9 - Stainless Steel

G ACCESSORIES	
0 - None	5 - Combination
1 - Temperature Controller	6 - Special
2 - Strainer Blowdown Valve	7 - Sight Glass
3 - Test Valve	8 - Thermometer
4 - Strainer Plug	9 - Separate Strainer

H TRIM OPTIONS	
A - Special Element	D - Combination
B - Welded Seat	R - Truflex
C - Screwed Seat	O - None

**Note:** For a more detailed list of available trims, contact the factory or visit our web site at [www.velan.com](http://www.velan.com)

## TABLE OF SAFETY FACTORS

TYPE OF EQUIPMENT	SAFETY FACTOR
Coils (Blast, Unit Heaters), Air Heaters, Dryers, Air Conditioning Plant:	
(a) Using inside air	2
(b) Using outside air:	3
Kilns, Drying Room Ovens, Steam Mains, Paper Machines, Drying Cylinders, Autoclaves, Platens, Laundry Ironers, Sterilisers	3
Heat Exchangers Calorifiers, Jacketted pans, Hot water Heaters, Temperature Control and where throttling steam controls are used	3-4

**Example:** A trap is required for a heat exchanger which is supplied with steam at 100 psi (7 bar) and has a consumption

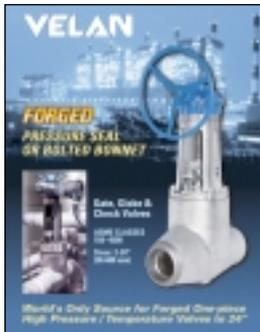
of 1500 lb (680 kg) steam per hour. The trap discharges to closed return main at a pressure of 10 psi (0.7 bar). The safety factor for this type application is 2.

	Imperial	Metric
Trap Inlet Pressure	100 psi	7 bar
Trap Outlet Pressure	10 psi	0.7 bar
Differential Pressure	90 psi	6.2 bar
Steam Consumption	1,500 lb/h	680 kg/h
Applying Safety factor of 2	3,000 lb/h	1,365 kg/h

**Therefore select trap from the individual Performance charts capable of discharging 3,000 lb/h (1,365 kg/h) at a Differential Pressure of 90 psi (6.3 bar).**

**THE MOST COMPREHENSIVE LINE OF INDUSTRIAL FORGED AND CAST STEEL  
GATE, GLOBE, CHECK, BALL, BUTTERFLY AND KNIFE GATE VALVES**

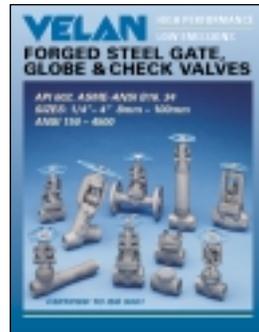
**ASME Pressure Classes 150–4500 in Carbon, Alloy and Stainless Steel**



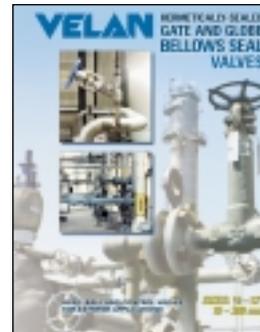
**VEL-PS**



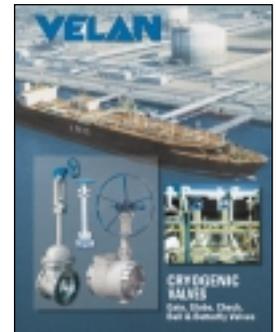
**VEL-BG**



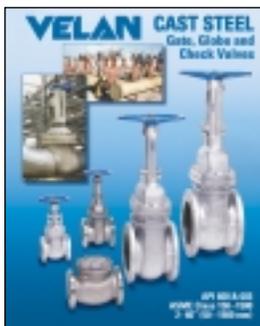
**VEL-SFV**



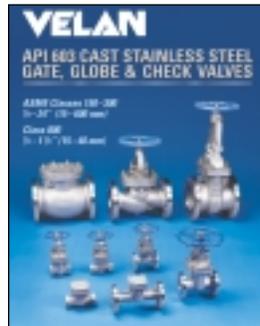
**VEL-BS**



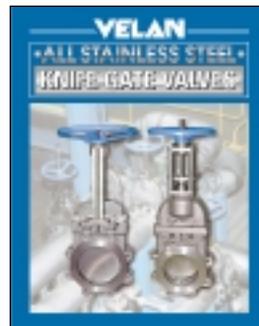
**VEL-CRYO**



**VEL-CSV**



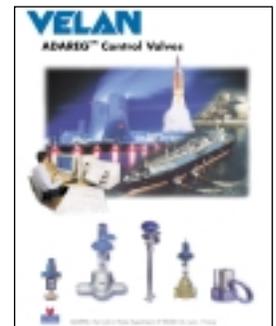
**VEL-API-603**



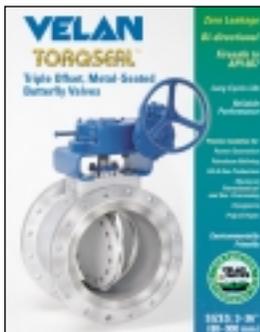
**VEL-KGV**



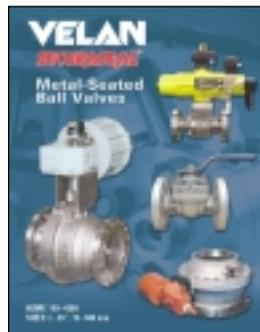
**VEL-PRO-CV**



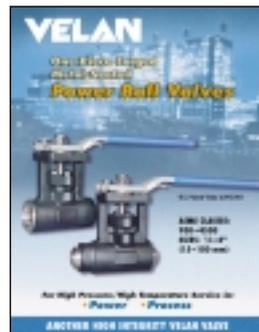
**VEL-ADCV**



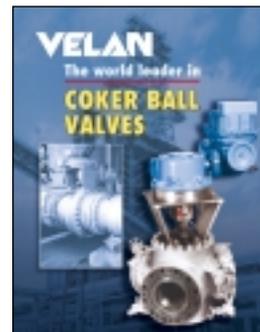
**VEL-BF**



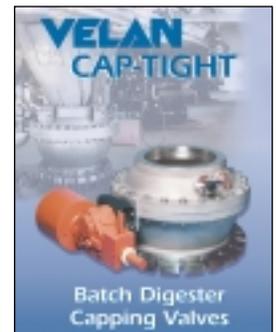
**VEL-MS**



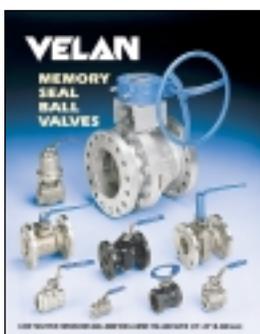
**VEL-PBV**



**VEL-CBV**



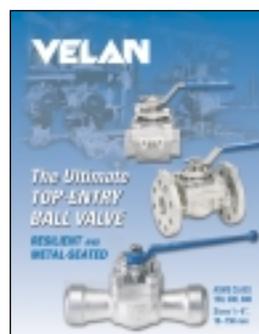
**VEL-BDC**



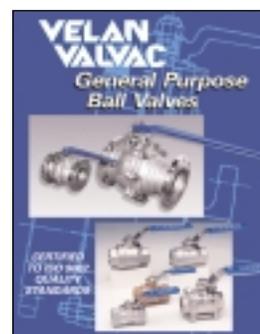
**VEL-BV**



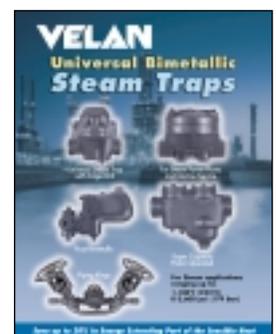
**VEL-UB**



**VEL-TE**



**VEL-GP2BV**



**VEL-ST**