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

The Most Efficient Steam Trap for High Pressure Steam Systems:
- Fossil Power
- Nuclear Power
- For High Pressure Processing
- Marine Service

VELAN
Universal Bimetallic Steam Traps

TYPE N

TYPE SPF
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 and steam traps 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 the last 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, founder and CEO of Velan Inc., and is now incorporated by other major steam trap manufacturers. Once again, you can trust Velan to supply high quality steam traps for virtually all of your condensate drainage applications.

FOR MORE INFORMATION CONSULT VELAN’S COMPLETE STEAM TRAP CATALOG

HEAD OFFICE & PLANT 5

MONTREAL, CANADA 115,000 sq. ft. (10,683 m²)
3 - 24” (80 - 600 mm) butterfly, ½ - 4” (10 - 100 mm) metal & resilient seated ball valves

MANUFACTURING LOCATIONS

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>MANUFACTURING PLANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CANADA</td>
<td>VELAN INC. HEAD OFFICE &amp; PLANT 5 7007 Crête de Liesse M. Montréal, QC H4T 1G2 Tel: (514) 748-7743 Fax: (514) 867-8865</td>
</tr>
<tr>
<td></td>
<td>PLANT 1 2125 Ward Avenue M. Montréal, QC H4M 1T6 Tel: (514) 748-7743 Fax: (514) 867-8865</td>
</tr>
<tr>
<td></td>
<td>PLANT 2/7 550 McArthur Ave. M. Montréal, QC H4T 1X8 Tel: (514) 748-7743 Fax: (514) 341-3132</td>
</tr>
<tr>
<td></td>
<td>PLANT 4/6 1010 Cowie Street Granby, QC J2J 1E7 Tel: (450) 378-2805 Fax: (450) 378-6865</td>
</tr>
<tr>
<td></td>
<td>PROQUIP 835 Fourth Line Oakville, ON L6L 5B8 Tel: (905) 842-1721 Fax: (905) 849-0023</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>VELAN VALVE CORPORATION PLANT 3 94 Avenue C Williston, VT 05495 Tel: (802) 863-2562 Fax: (802) 862-4014</td>
</tr>
<tr>
<td></td>
<td>ENGLAND VELAN VALVES LTD. Unit 1, Pinfold Road Lakeside Business Park Thurstonam, Leicestershire LE4 0AS Tel: 44-116 269-3172 Fax: 44-116 269-3695</td>
</tr>
<tr>
<td></td>
<td>FRANCE VELAN S.A.S. 90, rue Challemel Lacour F 69 367 Lyon Cedex 7 Tel: (33) 4 78 61 67 00 Fax: (33) 4 78 72 12 18</td>
</tr>
<tr>
<td></td>
<td>PORTUGAL VELAN VÁLVULAS INDUSTRIAIS, LDA. Av. Ayr dos Santos 1678-018 Famoees Tel: (351-21) 934-7800 Fax: (351-21) 934-7809</td>
</tr>
<tr>
<td></td>
<td>TAIWAN VELAN-VALVAC P.O. Box 2020 Taichung, Taiwan R.O.C. Tel: (04) 2702569 Fax: (886) 42750855</td>
</tr>
<tr>
<td></td>
<td>KOREA VELAN LTD. 1060-4 Shingil-Dong Ansan City, Kyunggi-do 425-833 Tel: (82) 31-491-2811 Fax: (82) 31-491-2813</td>
</tr>
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DISTRIBUTION CENTERS

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<th>COUNTRY</th>
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<tbody>
<tr>
<td>U.S.A.</td>
<td>VELCAL 537 Stone Road, Unit A * Benicia, CA 94510 Tel: (707) 745-4507 Fax: (707) 745-4708</td>
</tr>
<tr>
<td></td>
<td>VELEAST 605 Commerce Park Drive SE Marietta, GA 30060 Tel: (770) 420-2010 Fax: (707) 420-7063</td>
</tr>
<tr>
<td></td>
<td>VELAN GmbH Daimlerstrasse 8 D-47877 Willich Tel: (49) 2154/4938-0 Fax: (49) 2154/4938-99</td>
</tr>
<tr>
<td></td>
<td>GERMANY VELAN GmbH Daimlerstrasse 8 D-47877 Willich Tel: (49) 2154/4938-0 Fax: (49) 2154/4938-99</td>
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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 m²) ½-4” (8-100 mm) forged gate, globe & check valves, ASME ‘N’ stamp

**PLANT 2 & 7**

**MONTREAL, CANADA** 170,000 sq. ft. (15,800 m²) 2-60” (50-1500 mm) forged and cast steel gate, globe, check, ball, knife and butterfly valves 3-36” (80-700 mm) ASME ‘N’ stamp

**PLANT 4 & 6**

**GRANBY, CANADA** 186,500 sq. ft. (17,325 m²) 2-12” (50-300 mm) cast steel gate and check valves, ¼-12” (8-300 mm) ball valves

**TORONTO, CANADA Velan-Proquip** 41,000 sq. ft. (3,800 m²) 2-48” (50-1200 mm) wafer check valves ½-24” (15-600 mm) clamp joint connectors

**WILICH, GERMANY** 12,000 sq. ft. (1,115 m²)

**LEICESTER, ENGLAND** 14,000 sq. ft. (1,300 m²) Steam traps, ⅜-2” (10-50 mm) bonnetless globe valves

**LISBON, PORTUGAL** 60,000 sq. ft. (5,600 m²) 2-12” (50-300 mm) cast steel gate, globe and check valves

**PLANT 3**

**WILLISTON, VERMONT, U.S.A.** 155,000 sq. ft. (14,400 m²) 2-24” (50-600 mm) forged and cast steel gate, globe and check valves, ASME ‘N’ stamp

**LYON, FRANCE** 160,000 sq. ft. (14,900 m²) ½-40” (8-1,000 mm) forged and cast steel gate, globe and butterfly valves

**MEZZAGO, ITALY** 40,000 sq. ft. (3,700 m²) 1-64” (25-1600 mm) API 6A & 6D trunnion mounted ball valves

**ANSAN CITY, SOUTH KOREA Plant 1** 30,000 sq. ft. (2,800 m²) components and 2-4” (50-100 mm) cast steel valves

**ANSAN CITY, SOUTH KOREA Plant 2** 65,000 sq. ft. (5,800 m²) 2-12” (50-300 mm) cast steel gate, globe, check, ball and knife gate valves

**TAICHUNG, TAIWAN Velan-Valvac** 20,000 sq. ft. (1,840 m²) ½-2” (8-50 mm) ball valves
The problems of steam trapping high pressure (600 - 2500 psi) saturated or superheated (up to 1100°F) steam systems in fossil and nuclear power stations, aboard merchant and military ships, and in heavy oil extraction and petrochemical processes are different and more complex than steam trapping heating and standard process equipment at low and medium steam pressures.

These conditions call for extraction of condensate and entrapped moisture at steam or exhaust velocities ranging from 50 to 150 feet per second.

These high velocities may cause waterhammer, affecting the operational integrity of traps and piping.

Steam leakage through steam trap seats or orifice traps may cause rapid erosion, damaging vibration of piping, and even destruction of condensate handling pumps or aerating equipment.

Small drain openings in steam mains, for instance, will prevent effective extraction of condensate and special draining pockets must be provided. Backing up condensate in a properly designed drip pocket leading to the trap can be very useful. The drop in temperature of the accumulating condensate causes a simultaneous drop in pressure and water particles can easily find their way into the drip pocket and trap.

When steam lines are warmed up, condensation created by heat absorption of cold metal must be removed prior to operating turbine driven units.

In superheated steam mains, heat absorption causes drop in temperature.

For an effective and efficient drain collecting system, all drainage points must be carefully analyzed.

With the return of the saturated system installations brought about by nuclear power drainage, larger problems are faced.

Steam separators, by their scrubbing or centrifugal effect, combined with efficient steam traps will assure proper drainage at all times and the end result should more than justify the higher initial cost.

There is also a very limited choice of trap designs suitable for installations on steam systems ranging from 600 to 2500 psi.

**Bellow and Float Traps** are not available for this service.

**Inverted Bucket** Traps are extremely bulky, can easily lose their prime due to evaporation and become inoperative. These are not suitable for ship installations due to the effect of rolling action.

**Impulse Steam Traps** have been used successfully for pressures up to 1500 psi, but the constant leakage of steam through the control orifices, especially in superheated lines, cause great difficulties with condensate handling equipment and large losses in energy.

**Thermodynamic Disc Trap** operation is extremely violent and noisy and limited to 1740 psi. The trap has no air discharge capacity and shuts off completely on hot air. Frequent cycling (at least 290,000 times in 100 days) causes excessive wear. At 50% back pressure, the trap remains fully open, discharging steam at full blast into the return system.

**Orifice Traps** are inefficient and are not recommended.

This brochure is devoted to the Velan Patented Bimetallic Steam Trap and its unique advantages in trapping high pressure steam at temperatures up to 1100°F.

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**STEAM TRAPPING IN HIGH PRESSURE STEAM SYSTEMS**

- The problems of steam trapping high pressure (600 - 2500 psi) saturated or superheated (up to 1100°F) steam systems in fossil and nuclear power stations, aboard merchant and military ships, and in heavy oil extraction and petrochemical processes are different and more complex than steam trapping heating and standard process equipment at low and medium steam pressures.

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- **Orifice Traps** are inefficient and are not recommended.

- This brochure is devoted to the Velan Patented Bimetallic Steam Trap and its unique advantages in trapping high pressure steam at temperatures up to 1100°F.
STEAM TRAPPING
Steam Trapping of High Pressure Steam Systems in fossil or nuclear power stations requires serious consideration. Turbines and other equipment, such as pressure reducing valves and throttle and control valves, must be protected against damage by water hammer, due to high velocity steam carrying slugs of water. Water can collect in the system when a line is shut down for repair or reducing valves are closed. Water also collects during idle periods in the boiler feed pump lines and during start-up. All steam lines must be kept absolutely free of condensate at all times to prevent erosion of turbine blades. Steam Traps must have sufficient discharge capacity of air and water during warm-up and radiation losses, but must prevent leakage of high pressure steam which is very costly and can also damage downstream equipment. **Very few trap designs are available for handling condensate at high pressure.**

STEAM MAINS
Steam distribution piping leading to turbines and auxiliary equipment has to be extremely well trapped. Velan ‘N’ traps efficiently discharge air, gases and hot condensate during start-up. The steam traps must take care of:

1. The warm-up load for saturated or superheated systems.
2. The radiation load for saturated steam operation.
3. Condensate formed due to radiation losses.
4. Any prime carried over from boilers. In addition, traps must shut-off tightly on steam preventing costly leakage.

TURBINES
Traps provide automatic drainage of the turbine steam chest and casing, as well as from any other points where water can collect. The traps must perform under all conditions of pressure and temperature. Multiple extraction turbines are drained at each extraction. The load during warm-up periods is quite considerable.

OTHER IMPORTANT APPLICATIONS
Draining of fuel oil tracing, evaporators, separators, reheaters, heater drains, purifiers (large capacities require Velan Piston Steam Traps), superheater drums, de-superheater, boiler feed pumps, soot blowers, condensing units, etc.

DISCHARGE AT NEAR-TO-STEAM TEMPERATURES
The standard Velan ‘N’ trap opens only when condensate temperature drops 15-20°F. During this time the comparatively small quantity of near-to-steam temperature condensate collects in the drip pockets. Standard drip pockets, following established good piping practice, is all that is required to keep equipment free of condensate and eliminate steam leakage.

ADVANTAGE
The drop in temperature of the accumulating water causes a slight drop in pressure. Water particles flowing with steam can easily find their way into the drip pocket. Because the trap is under water most of the time, leakage of steam is impossible. Trap remains tight in presence of superheat.
A. OPERATIONAL DEMANDS IN POWER PLANT AND HIGH-PRESSURE TEMPERATURE STEAM SERVICE.

1. Efficient and fast discharge of air, uncondensable gases and cooler condensate at start-up.
2. Discharge condensate at near to steam temperature.
3. Resist high velocity flow.
5. Operate efficiently on superheated systems.
6. Handle waterhammer.

B. ANALYSIS OF MAJOR STEAM TRAP TYPES.

**Float Thermostatic or Bellows Steam Traps** are not suitable for operation on high-pressure (above 600 psi) or superheated service.

**Inverted Bucket Steam Traps** are very large and heavy (10 times the weight of Velan ‘N’ type 1,500 psi Trap) have very small air venting capacity, and are unsafe for automatic operation on superheat due to danger of evaporation of prime water.

**Impulse Steam Traps** leak a minimum of 500 lbs/hr through the \( \frac{1}{32} \)” control orifice at 1,500 psi. This amounts to enormous loss of energy especially with superheated steam and plays havoc with de-aerating and other auxiliary equipment.

**Orifice Traps** considering the leakage of 500 lbs/hr at 1,500 psi through a \( \frac{1}{32} \)” orifice, one can imagine the waste of energy when using orifice traps. Steam leakage through \( \frac{1}{16} \)” orifice amounts to 2,000 lbs/hr and really give little hot water capacity.

**Thermodynamic Disc Traps** have little or no air-venting capacity (remain closed in presence of air) and are highly wasteful on steam. With pressures 1,500 psi and higher, traps operate so violently that the mechanism becomes self-destructive.

IN VELAN STEAM TRAPS

1. The “downstream” valve is wide open at start-up for rapid air discharge.
2. Condensate is discharged at an energy-saving 15°-20°F below saturation conveniently installed drip pockets provide sufficient cooling leg for the traps and prevent any backup of water into mains or equipment.
3. Sturdy bimetal is not affected by superheat. **If anything, the trap is closed more firmly, saving enormous energy.**
4. No bellows, bucket or floats to be damaged by high velocity flow. Seat is stellited, ball valve is chrome steel 440C at Rc-62 or solid Stellite 6 (2,500 psi Class).
5. The trap is absolutely tight on saturated and superheated steam.
6. Not affected by waterhammer. The downstream located ball valve acts as a relief valve.
<table>
<thead>
<tr>
<th>TYPE OF STEAM TRAP</th>
<th>Inverted Bucket</th>
<th>Float Thermostatic</th>
<th>Bellows</th>
<th>Impulse</th>
<th>Thermodynamic</th>
<th>Orifice Trap</th>
<th>Velan Bimetallic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Discharge Automatic Warm-up</td>
<td>Very Limited</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Discharge Condensate At Saturation</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Operate On Superheated Steam</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Resist High Velocity Flow</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Tightness On Saturated &amp; Superheated Steam</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Handles Waterhammer</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Limited</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Suitability For High Pressure Service</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
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</table>

**ANALYSIS OF MAJOR STEAM TRAP TYPES & OPERATING PARAMETERS REQUIRED TO MEET THE SPECIFIC DEMANDS OF TRAPPING HIGH PRESSURE STEAM SYSTEMS**
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