BESTOBELL STEAM

Steam Traps and Steam Specialties

Steam Traps, Pressure Regulators , Steam System Auxiliaries and Test Equipment

The new shape in steam traps. . .
Bestobell's Delta Element

A sophisticated, yet simple, design that will provide years of trouble-free service with no steam loss.

Bestobell Steam's delta element is a triangular shaped bimetal strip of austenitic *and* ferritic stainless steels. The materials are rolled together, shaped into the delta pattern and then heat-treated to eliminate stresses.

The single blade design provides faster response than found with typical stacked arrangements due to the large surface/mass ratio. The stem is situated at a point that allows the expansion of the bimetal to exert a linear pull on the stem to prevent uneven wear on the sealing surfaces.

Thermostatic and Thermodynamic Forces

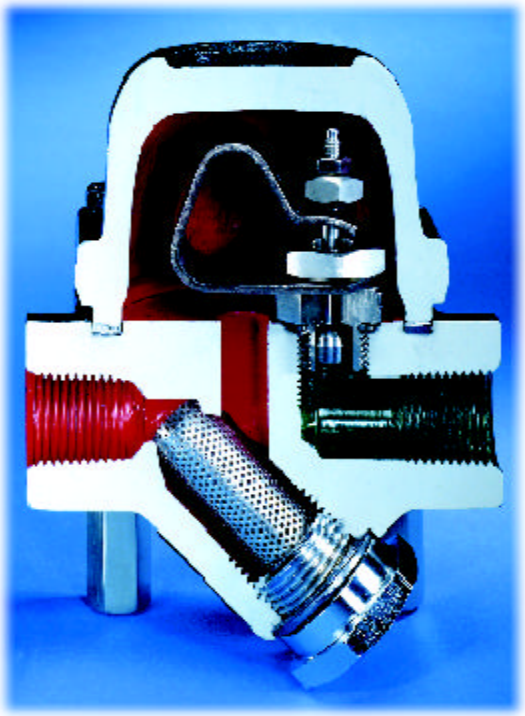
Bestobell traps are unique in that they employ a hybrid design that utilizes both thermostatic *and* thermodynamic principles to achieve a continuous *modulating* discharge of condensate *as it forms*, and *eliminates live steam loss*.

The combination of a temperature-sensitive closing force (*thermostatic element*) and a pressure-sensitive opening force (*thermodynamic valve*) overcomes the sluggishness and susceptibility to service failure than can be encountered with traditional bimetallic designs. The valve design utilizes the thermodynamic pressure forces of the flashing steam to provide quick response and a wide operating range closely approximating the steam curve.

Integral Strainers and Check Valves

Bestobell Steam saves you the added expense of buying and installing separate strainers and check valves to complete your steam trap station. Most models include a built-in strainer to protect the trap internals from dirt or foreign matter in your steam system.

The valve stem acts as an integral check valve to prevent backward flow of condensate. The Delta Element Trap can operate in applications with back pressures of up to 70% of inlet pressures due to the adjustable design of the element.



Benefits of the Delta Design

- *Long Service Life* — single blade element is not prone to problems with dirt buildup as encountered in stacked bimetallic designs.
- *Stainless Steel Internals* — for long life and corrosion resistance.
- *Modulating Discharge* — automatically adjusts to operating pressure and load, overcoming problems associated with cyclic discharge.
- *Fast Start-Up* — due to high cold discharge capacities.
- *Continuous Air and Co_2 Venting* — maximizes heat transfer, minimizes plant corrosion.
- *No Loss of Live Steam* — for greater energy efficiency and long seat life. Warranted up to three years against the loss of live steam in operation.

Steam trap operation . . . dual forces for optimal performance

Following the steam curve is the key to efficient steam trap performance. Utilizing dual thermostatic/ thermodynamic forces allows Bestobell Steam delta traps to match the steam curve. This means that the energy in the steam is efficiently used by your process, and not wasted in the operation of the steam trap.

Initial System Start-Up

On initial start-up of the steam system, large amounts of cold condensate and air are present in the system. At this point, the bimetallic strip of the delta element relaxes and fully opens the valve assembly to quickly expel the high volume of non-condensable gases and cold condensate through the discharge port.

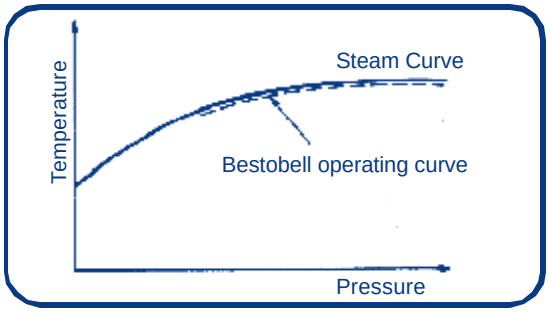
Thermostatic Forces for Tight Shutoff

As the element senses an increase in the condensate temperature, the bimetal expands and raises the stem to modulate flow. Just below the temperature of saturated steam, the seat will close tightly to prevent live steam from discharging.

Conversely, lower temperature condensate relaxes the bimetal, allowing the valve to open. With this valve opening, the system differential pressure acts on the diameter of the plug, which increases the force of the opening to allow faster and heavier condensate discharge capacity.

Thermodynamic Forces

As high pressure condensate is discharged to a lower pressure variable (either atmospheric or a pressurized condensate return system), thermodynamic forces develop. These forces are introduced via a three stage orifice that contains an expansion chamber that is formed between the seat and skirt of the valve stem. The controlled pressure drop through the second stage orifice into the expansion chamber, and the resulting intermediate pressure, creates an opening force that increases hot discharge capacity. It also results in only a small percentage of the total pressure drop occurring at the valve seat, which significantly reduces wear.



Controlling Flash Steam Provides Higher Discharge Capacities

As the temperature of the condensate increases, the element assembly acts to modulate the flow. As hot condensate is discharged, a portion of it flashes back to steam, and attempts to occupy a space much larger than it would as condensate.

The controlled generation of flash steam within the expansion chamber enhances the pressure forces acting on the diameter of the plug to increase hot discharge capacity.

No Live Steam Loss

As the temperature of the condensate nears the steam curve, the delta element expands moving the stem closer to the seat and flashing occurs in the upper portion of the discharge orifice. This momentarily chokes the flow and results in an instantaneous drop off of pressure acting on the plug, causing the plug to be pulled tightly against the seat.

Under extremely low loads, the trap will remain closed until the pressure opening force of the condensate overcomes the temperature closing force of the bimetal. A small seal of condensate is always maintained over the valve orifice to prevent the loss of live steam, because live steam cannot pass through water.

Under normal operating conditions, the trap modulates to follow process conditions and discharge condensate as it is formed. This provides smoother operation than with cyclic discharge traps, thus reducing unnecessary stresses and contributing to long service life.

Bestobell Steam Technology

Delta Element

- Long-term, trouble-free service due to single blade element, stainless internals, built-in strainer and check valve.
- Only 30 - 40% of total pressure drop occurs over seating surface resulting in long valve life.
- Problems due to cyclic discharge are eliminated with modulating discharge
- High cold discharge capacities provide fast start-up capabilities.
- Excellent heat transfer and minimum corrosion by continuous air and CO_2 venting.

Disc

- Single moving part for minimal maintenance and long operating life
- High capacities
- Rugged design can withstand effects of water hammer and vibration

Inverted Bucket

- Unique linkage system provides for maximum flow capacities.
- Increased trap life and minimal impact from corrosion is achieved by hardened stainless steel valve and seat.
- Reliable and industry accepted design for applications where cyclic design is desirable.

Float & Thermostatic

- Enhanced sensitivity to pressure and temperature conditions.
- Continuous condensate discharge.
- Maximum heat transfer is provided by separate internal air and CO2 venting.
- Easy in-line inspection and repair. Removable flush plug permits easy cleaning.

Capsule

- Small and lightweight thermostatic design provides good discharge of condensate and non-condensible gases and is easily maintainable.

Drip and Tracer Steam Traps

Drip and Tracer traps are used to discharge condensate from steam line drip and tracing applications.

Drip & Tracer

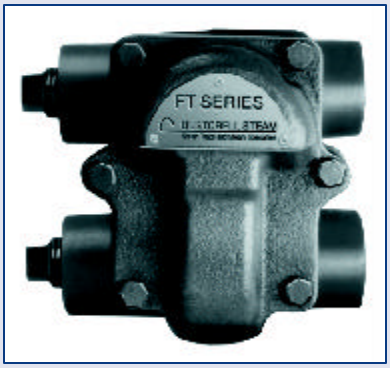
Model Number	Technology	Sizes	Body Materials	Max. Differential Pressure psi (bar)
DM6	Delta Element	3/8", 1/2", 3/4"	Carbon Steel	70 (4,8)
DM12	Delta Element	3/8", 1/2", 3/4"	Carbon Steel	150 (10,3)
DS12	Delta Element	1/2", 3/4"	Stainless Steel	150 (10,3)
DM25	Delta Element	1/2", 3/4"	Carbon Steel	320 (22,0)
IB18H	Inverted Bucket	1/2", 3/4", 1"	Cast Iron	250 (17,2)
IB18S	Inverted Bucket	1/2", 3/4", 1"	Cast Iron	250 (17,2)
IB18V	Inverted Bucket	1/2", 3/4", 1"	Cast Iron	250 (17,2)
IB21V	Inverted Bucket	1/2", 3/4"	Carbon Steel	300 (20,7)
IB41V	Inverted Bucket	1/2", 3/4", 1"	Carbon Steel	600 (41,4)
DCM21	Capsule	3/8", 1/2"	Carbon Steel	300 (20,7)
GSM17	Capsule	3/8", 1/2", 3/4"	Stainless Steel	250 (17,2)
GCM17	Capsule	1/2", 3/4", 1"	Carbon Steel	250 (17,2)
TCM7	Capsule	3/8", 1/2"	Bronze	100 (6,9)
DT64	Thermodynamic Disc	3/8", 1/2", 3/4", 1"	Stainless Steel	600 (41,4)
DT65	Thermodynamic Disc	1/2", 3/4", 1"	Carbon Steel	450 (31,0)

Tracer (sub-cooled)

Model Number	Technology	Sizes	Body Materials	Max. Differential Pressure psi (bar)
M22	Delta Element	3/8", 1/2", 3/4"	Carbon Steel	300 (20,7)
TS22	Delta Element	1/2", 3/4"	Stainless Steel	300 (20,7)
TM22	Delta Element	3/8", 1/2", 3/4"	Carbon Steel	300 (20,7)

Freeze Protection & Drainage

Model Number	Technology	Sizes	Body Materials	Max. Differential Pressure psi (bar)
DM10E	Delta Element	3/8", 1/2", 3/4"	Carbon Steel	120 (8,3)



High Pressure Steam Traps

Use for removal of condensate from steam main drip lines, turbine drains, heaters and soot blowers.

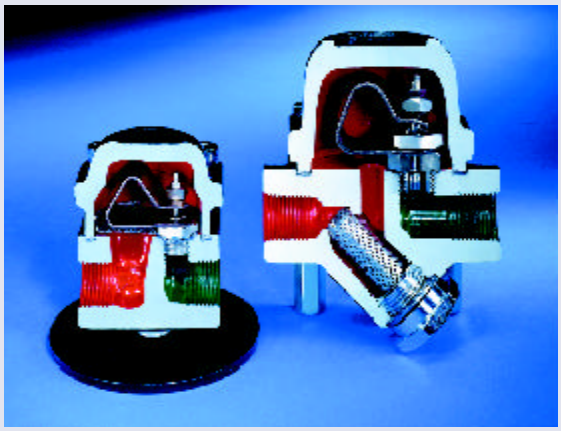
Model Number	Technology	Sizes	Body Materials	Max. Differential Pressure psi (bar)
DM40	Delta Element	1/2", 3/4", 1"	Carbon Steel	450 (31,0)
M40	Delta Element	1-1/2", 2"	Carbon Steel	450 (31,0)
DM64	Delta Element	1/2", 3/4", 1"	Carbon Steel	600 (41,4)
M64	Delta Element	1-1/2", 2"	Carbon Steel	600 (41,4)
DM100	Delta Element	1/2", 3/4", 1"	Carbon Steel & CrMo	900 (62,1)
M100	Delta Element	1-1/2", 2"	Carbon Steel	900 (62,1)
DM160	Delta Element	1/2", 3/4", 1"	CrMo	1500 (103,5)
DM320	Delta Element	1/2", 3/4", 1"	CrMo	2000 (137,9)
B21V	Inverted Bucket	1/2", 3/4"	Carbon Steel	300 (20,7)
B41V	Inverted Bucket	1/2", 3/4", 1", 1-1/2", 2"	Carbon Steel	600 (41,4)
DT64	Thermodynamic Disc	3/8", 1/2", 3/4", 1"	Stainless Steel	600 (41,4)
DT65	Thermodynamic Disc	1/2", 3/4", 1"	Carbon Steel	450 (31,0)

Process and Space Heating Steam Traps

These traps are used to discharge condensate from all manner of heat exchangers, tank preheat coils, platen presses, air heaters, paper machines, autoclaves, etc., that are used for process applications and air heating.

Process & Space Heating

Model Number	Technology	Sizes	Body Materials	Max. Differential Pressure psi (bar)
3A	Delta Element	3/8", 1/2", 3/4"	Carbon Steel	30 (2,1)
GM3	Delta Element	1/2", 3/4",1-1/4", 1-1/2", 2"	Carbon Steel	30 (2,1)
DMR6	Delta Element	1/2", 3/4"	Brass	70 (4,8)
6A	Delta Element	3/8", 1/2", 3/4"	Carbon Steel	70 (4,8)
GM6	Delta Element	1/2", 3/4", 1", 1-1/4", 1-1/2", 2"	Carbon Steel	70 (4,8)
M10	Delta Element	3/8", 1/2", 3/4"	Carbon Steel	120 (8,3)
GM10	Delta Element	1/2", 3/4", 1", 1-1/2", 2"	Carbon Steel	120 (8,3)
M16	Delta Element	1/2", 3/4", 1", 1-1/2", 2"	Carbon Steel	200 (13,8)
GM16	Delta Element	1/2", 3/4"	Carbon Steel	200 (13,8)
M25	Delta Element	1/2", 3/4", 1", 1-1/2", 2"	Carbon Steel	320 (22,0)
GM25	Delta Element	1/2", 3/4"	Carbon Steel	320 (22,0)
IB18H	Inverted Bucket	1/2" to 2"	Cast Iron	250 (17,2)
IB18S	Inverted Bucket	1/2", 3/4", 1", 1-1/4"	Cast Iron	250 (17,2)
IB18V	Inverted Bucket	1/2" to 2"	Cast Iron	250 (17,2)
IB21V	Inverted Bucket	1/2", 3/4"	Carbon Steel	300 (20,7)
IB41V	Inverted Bucket	1/2", 3/4", 1", 1-1/2", 2"	Carbon Steel	600 (41,4)
FT015	Float & Thermostatic	3/4", 1", 1-1/4", 1-1/2", 2"	Cast Iron	15 (1,1)
FT030	Float & Thermostatic	3/4", 1", 1-1/4", 1-1/2", 2"	Cast Iron	30 (2,2)
FT075	Float & Thermostatic	3/4", 1", 1-1/4", 1-1/2", 2"	Cast Iron	75 (5,1)
FT125	Float & Thermostatic	3/4", 1", 1-1/4", 1-1/2", 2"	Cast Iron	125 (8,6)
FTH50	Float & Thermostatic	3/4", 1", 1-1/4", 1-1/2", 2"	Ductile Iron	200 (13,8)
DCM21	Capsule	3/8", 1/2"	Carbon Steel	300 (20,7)
GSM17	Capsule	3/8", 1/2", 3/4", 1"	Stainless Steel	250 (17,2)
GCM17	Capsule	1/2", 3/4", 1"	Carbon Steel	250 (17,2)
TCM7	Capsule	3/8", 1/2"	Bronze	230 (15,8)
GCR7	Capsule	1/2"	Bronze	230 (15,8)
DT64	Thermodynamic Disc	3/8", 1/2", 3/4", 1"	Stainless Steel	600 (41,4)
DT65	Thermodynamic Disc	1/2", 3/4", 1"	Carbon Steel	450 (31,0)
Magnum	Delta Element High Capacity	Sized per application	Carbon Steel	320 (22,0)



Other Products

Y-Type Line Strainers

Y-type line strainers protect your steam system against the damage than can occur to valves, traps, and other equipment when foreign matter such as dirt, scale, or welding particles travel through the pipeline. Available with threaded or flanged ends in carbon steel, stainless steel, bronze, or cast iron for services up to 1480 psi (102,04 bar).

Condensate Return Pumps

The “POPS” pressure-operated pump system is constructed of quality materials for effective operation in hazardous locations and in the handling of corrosive liquids. The tank is Cast Iron and all internal working parts, including the float, valve and mechanical linkage are Stainless Steel. Pumps are available in two tank sizes and as skid-mounted pump stations.

Moisture Separators

The SEP Series is a cast or fabricated “T”-type entrainment separator that will remove 99% of all liquid droplet and solid particle entrainment greater than ten microns in size. Available in cast iron and carbon for services up to 250 psig (17,24 bar) and cast iron and stainless steel for services up to 750 psig (51,71 bar).

Pressure Regulators

Model PR300 is hard-seated pressure reducing and regulating valve suitable for steam applications with supply pressures to 300 psi (20,68 bar). The PR300 offers exceptional performance, easy in-line maintenance, and heavy duty construction for reliable, long-term operation. Available in ductile iron, carbon steel or 316 SST.

Vacuum Breakers

The VB70 Series is a general purpose vacuum breaker for use on steam and liquid services with pressures up to 232 psi (15,99 bar). The use of the VB70 allows air to enter the steam or liquid pipeline to relieve vacuums which would inhibit flow or drainage and decrease system performance and efficiency.

SteamTector

An ultrasonic leak detection device used to check and locate failures of steam traps, valves and other steam equipment. This device quickly detects steam leakage as well as leaks in air and gas systems. The ultrasonic test procedures are “the” most reliable means of checking steam traps.

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