Temperature Control Steam Traps are bimetallic steam traps which do not follow the steam saturation curve. The discharge temperature can be adjusted manually, which allow these steam traps to adopt to a wide range of applications, where optional undercooling is possible and where sensible heat savings and flash steam reduction are desirable. These steam traps are perfectly fitted for reducing the steam consumption at steam main and steam tracing lines thus guaranteeing a high degree of energy savings.

Types
- **TB7N & TB9N** with forged steel body for low and medium pressure applications
- **TBC2, TBC2B** with stainless steel body for low pressure tracing
- **TB1N** with steel body for low pressure applications
- **TB51/52** with forged steel body for high pressure applications
- **TBH71/72/81/82** with cast steel body for high pressure applications

Features
- All traps are equipped with the patented valve mechanism SCCV®-System (see pages 78 – 79).
- The SCCV®-System ensures a superior closing performance in the center of the port, greatly reduced wear of the internal parts and extended lifetime of the trap.
- Highly efficient in energy conservation – eliminates virtually 100% of steam loss.
- Continuous discharge of the condensate according to the adjusted temperature – not influenced by inlet pressure changes.
- Inline repairable – easy and quick replacement of the bimetal unit and the seat.
- Readjustment possible while the trap is in operation (for low pressure applications).
- All traps equipped with integral strainer.
- Can be installed both horizontally and vertically.

Suitable for:
- **TB7N** Steam main lines and tracing lines
- **TB9N** Steam main lines, tracing and small heat exchanger applications with specific condensate undercooling
- **TBC2, TB1N** Steam tracing lines
- **TB51/52** High tracing lines
- **TBH71/72/81/82** High pressure steam main lines

Operating principle

1) On start-up, the bimetal discs are all flat and the valve shaft is up with the valve fully open. Virtually all cold condensate and air are discharged.

2) As the temperature of the condensate increases, the bimetal discs begin to curve gradually and force the valve shaft and the valve holder to move down.

2a) Most of the condensate is still discharged quickly, since the valve and the holes in the fixed guide on the valve seat are still fully open.

3) When condensate with higher temperature (near to set temperature) flows in, the bimetal discs are curved even more and at the same time the valve shaft moves down and the valve holder closes the holes in the guide partially.

3a) The amount of condensate being discharged is reduced quickly. This prolongs the time that the hot condensate stays near the bimetal discs and the heat of the condensate is transferred to the bimetals much more effectively.

4) In case of very low condensate flow, the holes in the guide are closed completely by the valve holder and the valve will close precisely in the center of the seat. Normally, the trap is filled with hot condensate and the operation will rest in the state shown in figure 3. Condensate will be discharged continuously at a stable temperature (very close to the set temperature).
Balanced Pressure Thermostatic Steam Traps are equipped with a capsule element, which controls the discharge of condensate depending on the temperature. The capsule contains a special liquid, whose saturation temperature at a given pressure is always lower than that of the water. It ensures a very accurate functioning of the steam trap and is self-adjusting.

The discharge characteristic follows the saturation curve independent from pressure changes and the condensate load.

Series D MIYAWAKI steam traps can be delivered with 3 different capsule types:

- Types H & C discharge hot condensate at approximately 5°C (9°F) below saturation temperature
- Type L discharges hot condensate at approximately 15°C (27°F) below saturation temperature

Types

- DC1, DC2
- DV1, DL1, DX1
- DF1

Features

- Excellent air venting characteristics at start-up and during operation
- Insensitive to waterhammer
- The operation will not be influenced by back pressure
- At time of non-operation self-draining
- No steam loss throughout its operating range
- All traps equipped with integral strainers
- Can be installed both horizontally and vertically
- Easy in-line inspection and maintenance
- Lightweight, compact design

Suitable for light to medium condensate loads: steam tracing, steam main drips, small heat exchangers, unit heaters, steam heating coils and many other applications in the petrochemical, chemical, textile, food, pharmaceutical and other industries.

Operating principle of DV1 when using the bypass valve

When the handle is turned in the direction indicated by the BLOW arrow on the nameplate (counterclockwise), the bypass valve will open, a bypass circuit will be formed inside the trap, and a large volume of air and condensate can be discharged quickly. Scale that has accumulated in the screen can also be blown out.

When the bypass valve is closed, the type DV1 will operate as a normal steam trap (see above operating principle).
Thermodynamic Disc Traps

Thermodynamic steam traps operate on the basis of the Bernoulli principle, depending on the relationship between the velocity and the pressure exerted by the condensate and steam inside the steam trap. They have only one moving part – the disc. Due to their compact design and cost effectiveness thermodynamic steam traps are widely used in applications where the condensate must be removed immediately from steam lines and steam equipment. They discharge the condensate near the saturation temperature. The traps may operate up to a back pressure of 80% of the inlet pressure, but for smooth operation it is recommended that the back pressure does not exceed 50% of the inlet pressure. Thermodynamic steam traps discharge the condensate intermittently.

All steam traps are equipped with a hardened stainless steel disc and seat. After the lapping process all disc surfaces are controlled individually before releasing them for use in steam traps. These features and very high and severe quality standards for the whole production process give MIYAWAKI’s thermodynamic steam traps a long and reliable service life.

**Types**
- **S31N** Ductile Cast Iron Steam Traps with replaceable internals
- **SC31** Stainless steel steam traps with replaceable internals
- **SC, SF** Cast Iron Steam Traps for high capacity
- **SV** Steam Traps with inbuilt bypass
- **SL3** Compact, very small trap for low capacity applications
- **SU2N, SU2H, SD1** Stainless steel steam traps for low to high pressure applications
- **S55N, S55H, S61N, S62N** Forged steel steam traps for high pressure applications

**Features**
- Immediate discharge of condensate
- Insensitive to waterhammer, superheated steam and freezing
- Most types contain a bimetal ring which improves the ability of the trap to discharge air and cold condensate quickly at start-up and prevents air locking during times of operation
- Can be installed in vertical or horizontal position
- In case of danger of air locking special discs available
- All traps equipped with additional cover for reduced frequency of cycling and energy savings
- All traps with inbuilt strainers (except SL3)
- Easy maintenance

**Suitable for** light to medium condensate loads: steam tracing, steam main drips, small heat exchangers, unit heaters, sterilizers and many other applications in the petrochemical, chemical, textile, food, pharmaceutical and further industries. Series SV Thermodynamic steam traps with inbuilt bypass are designed for special applications in the food, pharmaceutical or other industries or for laundry applications where costs and space must be saved.

**Operating principle**

1. At the time of start-up the pressure of the incoming cold condensate and air raise the disc and water and air are discharged quickly.
2. When hot condensate flows into the trap, the trap is still open and the hot condensate can be discharged quickly.
3. After hot condensate flows into the trap, steam enters it. As the velocity of the fluid increases, the pressure under the seat exerted by the steam decreases. At the same time the pressure in the pressure chamber above the disc increases. The disc is pressed down and closes.
4. While hot condensate flows into the trap, the trap remains closed for a certain period, as far as the steam inside the pressure chamber does not condense. The more condensate flows into the trap, the more the temperature cools down. The steam inside the pressure chamber also cools down and condenses. As a result, the pressure of the incoming condensate raises the disc and condensate is discharged. Cycles 2, 3 and 4 repeat.
Inverted Bucket Steam Traps belong to the family of mechanical traps. They operate on the difference in density between steam and water. MIYAWAKI offers a very wide range of inverted bucket steam traps for small up to large condensate loads. Inverted bucket steam traps discharge the condensate intermittently.

**Types**
- **ER** Cast Iron Inverted Bucket Steam Traps for medium up to high condensate loads
- **ES** Cast Iron Inverted Bucket Steam Traps for small up to medium condensate loads
- **ESH, ER25** Cast Steel Inverted Bucket Steam Traps for high pressure and small up to high condensate loads
- **ESU** Stainless Steel Inverted Bucket Steam Traps for small up to medium condensate loads

**Features**
- All traps are equipped with stainless steel wear and corrosion resistant lever, valve and seat system for long and troubleless life.
- All valves and seats are lapped together.
- Traps of the series ER contain the patented SCCV® (Self Closing and Centering Valve) – System, which increases the lifetime of the valve and seat substantially.
- A small hole in the top of the bucket secures continuous automatic air venting.
- All traps are designed for quick and easy inline repairability.
- Withstands high back pressure (up to 90%).

**Application**
Heat exchangers, dryers, unit heaters, sterilizers and other applications, where condensate must be removed immediately

**Super-Discharger**
1. Incorporates the MIYAWAKI SCCV®-System (see pages 78 – 79)
2. Double valve system with needle pilot valve and main valve (for ER Type)
3. Operates by the pressure difference inside the valve unit
4. Makes the discharge capacity very large
5. Designed for high pressure up to 6,4 MPa (925 psig) – only for ER25

**Operating principle**

1 & 2
Steam enters the trap under the bottom of the bucket. The more steam is entering the trap, the more it collects at the top of the bucket, causing the bucket to move upwards (buoyancy of the bucket inside the water). At the top position of the bucket the valve will close the seat.

3 & 4
Air and gases pass through a small hole in the top of the bucket and collect at the top of the trap. Steam is also passing through the hole and condensing. When more condensate is entering the trap, the bucket will loose its buoyancy and will move down. The valve will open and condensate will discharge.

5 & 6
On start-up the bucket is down and the valve is open. Low temperature condensate and air, later high temperature condensate enter the trap. The condensate fills the bucket and the trap body completely. As the bucket is completely submerged in the water, it lies on the bottom of the trap, the valve is wide open and condensate will discharge.
Ball Float Steam Traps belong to the family of mechanical traps. They operate on the difference in density between steam and water. A ball float is connected with a lever to the valve and seat or it is floating freely inside the valve body. Condensate will be discharged once it reaches a certain level inside the trap. Condensate is discharged continuously.

### Types

<table>
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<tr>
<th>Type</th>
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<td>G15N</td>
<td>Cast Iron Steam Trap for low pressure and large condensate loads</td>
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<td>G3N-G5, G2-G8</td>
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</tr>
<tr>
<td>GC20</td>
<td>Stainless Steel Steam Trap for medium condensate loads</td>
</tr>
</tbody>
</table>

### Features

- All traps are equipped with stainless steel wear and corrosion resistant float, lever, valve and seat systems for a long and problem free operation.
- Each ball float steam trap is equipped with an air vent for venting air and gases at the time of start-up and during operation.
- The large capacity steam traps like G2-G8, GH2-GH8 use a double ported balance valve system, which is small in its physical size compared with the very high capacity of the traps.
- All traps are designed for quick and easy maintenance.

### Application

Ball Float Steam Traps can be used in all process applications, like all kind of heat exchangers, tank and unit heaters and others, where condensate must be removed immediately after it forms.

The type GC1 is especially designed for applications in the food, pharmaceutical and other industries with small condensate loads and the need for stainless steel bodies. It can be also installed for drainage of steam main lines.

### Operating principle

1. **On start-up air is quickly discharged through the thermostatic air vent (membrane or bimetal type).** Cold condensate fills the steam trap body. As soon as a certain water level is reached, the float rises and opens the valve. The cold condensate is discharged through the open valve and the open air vent.

2. **When the condensate reaches saturation temperature, the air vent closes and condensate is discharged only through the main valve orifice.** The condensate forms a water seal inside the trap body, which prevents live steam loss at all times.

3. **The opening degree of the valve is regulated by the water level inside the trap body. Condensate is discharged continuously.** As long as air enters the trap and accumulates at the top of the trap body, the temperature cools down a little bit and the air vent, which opens slightly below saturation temperature, begins to discharge the air from the trap.