



## APPLICATION NOTE

### Thermal Shut-off Valve TSV

The Sentry Thermal Shut-off Valve (TSV) is a self contained unit which automatically interrupts sample flow when the sample temperature reaches a preset limit.

High sample temperature can result from a number of causes:

1. Loss of cooling water
2. Insufficient cooling water pressure or flow
3. High cooling water temperature
4. High sample flow rate
5. Ruptured coil in the sample cooler
6. Fouled or plugged sample cooler

Whatever the cause, the line must be shut down quickly to prevent damage to equipment or serious injury to personnel. The Sentry TSV is the solution because the line will close in less than five seconds after the sample temperature reaches the setpoint, normally 120°F (49°C).

The Sentry TSV is a self contained device that requires no external source of electricity, air, or hydraulics. The sensor/ actuator is directly exposed to the sample medium providing near instantaneous reaction to an upset.

The tripping temperature is set at the factory and can not be readily altered by plant personnel. The standard setpoint temperature is 120°F (49°C) but other temperature settings are available upon request.

The TSV provides positive closure. It must be manually reset after a trip - ensuring that sample flow is not resumed before the cause of the upset has been corrected. A red indicator gives visual evidence of which valve has tripped. An optional position indicating dry contact is available to provide a signal for a remote alarm.

Wetted materials are 316 stainless steel and elastomers which are compatible with boiler water and steam. Consult factory on other sample media if in doubt.



## APPLICATION NOTE

### THERMAL SHUT-OFF VALVE

#### *Alternate Devices*

Prior to the introduction of the Sentry TSV, the most common means of high temperature protection was a sensor (RTD or thermocouple) and a solenoid valve.

The solenoid valve has several drawbacks for this service:

1. Requires electricity which is not always available and presents an explosion hazard in hydrocarbon sampling
2. Prone to sticking
3. Prone to burning out
4. Very large and expensive for high pressure lines
5. Alarm signal is by electrical contact rather than valve movement
6. Magnetic field attracts corrosion products (magnetite) which leads to sticking and plugging of the valve
7. In high pressure applications, the Cv is low and the line draw required to hold the valve open is large
8. Waterproof enclosure is required in many power plant sample panel installations

Another alternative uses pneumatic actuators instead of electrical solenoids. This eliminates many of the undesirable features of the solenoid, but air is not always available or reliable. The actuator is quite large and outdoor lines can freeze if the air is not properly dried.

Commercially available wax operated valves, similar to the Sentry TSV, can be used. But when the valve cools down it will reopen. This can present greater hazards than the initial trip.

A fourth and rather rare approach is the use of fusible wax operators. Upon tripping, the wax is lost and must be replaced.

#### **▲WARNING**

It is solely the responsibility of the end-user, through its own analysis and testing, to select products and materials suitable for their specific application requirements, ensure they are properly installed, safely applied, properly maintained, and limit their use to their intended purpose. Improper selection, installation, or use may result in personal injury or property damage.



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