

# Steam Asset Management – Wireless Solutions

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# Topics

1. Why Are Steam Traps Important
2. Manually Steam Trap Survey
3. Common Monitoring Applications
4. Key Applications
5. Benefits of ISA 100
6. Use Case Examples

# Why Steam Trap Monitoring?

**Fails open**

(Leaking or Blow-Thru)

**Fails closed**

(Cold)



# Why Steam Trap Monitoring?

If the steam trap **fails open**  
(Leaking or Blow-Thru):

- Increased back pressure.
  - Reduced flow for surrounding steam traps.
- Steam losses (monetary losses).
- Safety issue.
- Environmental issue...



# Why Steam Trap Monitoring?

If the steam trap **fails closed** (Cold):

- Wet steam.
  - Water hammering.
  - Turbine damage.
  - Erosion on valves, reducers ...
- “Stalling” or flooded heat exchanger.
  - Decrease in production.
  - Reduced heat transfer.
  - Process losses.
  - Thermal stress...



# Steam Trap Importance

Steam Loss Thru an Orifice Drip & Tracer Application			
Orifice	150psig [\$/Year]	250psig [\$/day]	400psig [\$/Year]
#38	398,215	640,210	1,002,655
7/64"	462,455	743,140	1,164,350
1/8"	604,075	970,900	1,520,955
5/32"	213,890	1,516,940	2,376,515
11/64"	1,142,085	1,835,585	2,875,470
3/16"	1,359,260	2,184,160	3,422,240
7/32"	1,849,820	2,972,925	4,657,765
1/4"	2,416,300	3,883,235	6,083,820
5/16"	3,775,195	6,067,395	9,505,695
3/8"	5,436,310	8,737,005	13,688,230
1/2"	9,664,835	15,532,940	24,334,915
9/16"	12,231,880	19,658,535	30,798,700
11/16"	18,272,265	29,366,805	46,008,250
3/4"	21,745,605	34,948,750	54,753,285

\$ Loss Thru an Orifice Drip & Tracer Application			
Orifice	150psig [\$/Year]	250psig [\$/Year]	400psig [\$/Year]
#38	\$3,982.15	\$6,402.10	\$10,026.55
7/64"	\$4,624.55	\$7,431.40	\$11,643.50
1/8"	\$6,040.75	\$9,709.00	\$15,209.55
5/32"	\$2,138.90	\$15,169.40	\$23,765.15
11/64"	\$11,420.85	\$18,355.85	\$28,754.70
3/16"	\$13,592.60	\$21,841.60	\$34,222.40
7/32"	\$18,498.20	\$29,729.25	\$46,577.65
1/4"	\$24,163.00	\$38,832.35	\$60,838.20
5/16"	\$37,751.95	\$60,673.95	\$95,056.95
3/8"	\$54,363.10	\$87,370.05	\$136,882.30
1/2"	\$96,648.35	\$155,329.40	\$243,349.15
9/16"	\$122,318.80	\$196,585.35	\$307,987.00
11/16"	\$182,722.65	\$293,668.05	\$460,082.50
3/4"	\$217,456.05	\$349,487.50	\$547,532.85

\*\$10 per 1,000#



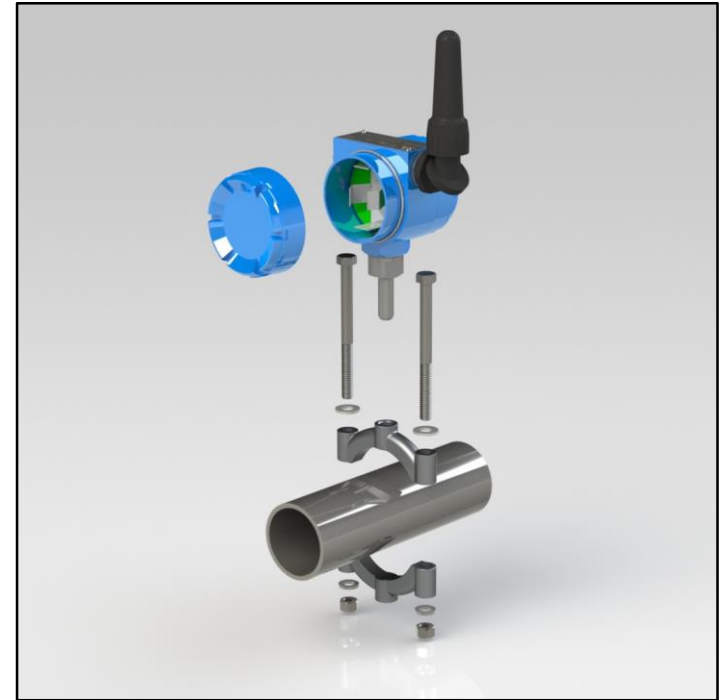
# Manually Survey Steam Traps

- Point in time event
  - Typically Annual Survey
  - Potential Safety Risk
  - Unknown Losses
- Slow and Time Consuming
  - Manual Data Entry
  - Surveyor visits each trap
- Requires Experience Technician
  - Acoustic
  - Temperature
  - Various inputs



# Transmitter

- Non-Intrusive
  - Waveguide Installation
- Monitor any
  - Trap Type
  - Manufacture
  - Pressure
  - Application



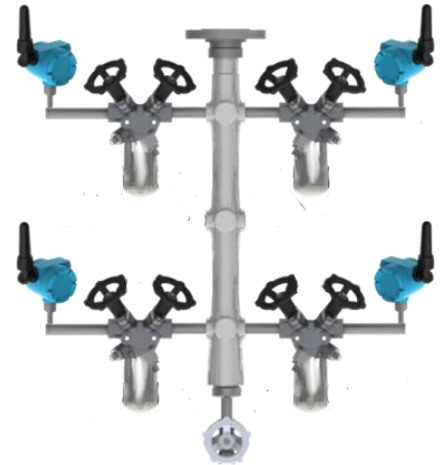


# Common Monitoring Applications

- Critical Applications
  - Tracing
  - Steam Turbines
  - Towers
  - Exchangers
- High pressure steam traps
  - Boiler headers/ steam distribution
- Hard to reach steam traps
  - Pipe racks
  - Operating Unit Equipment

# Critical Steam Tracing

- What
  - Sulfur
  - Polymers
  - Viscous Fluids
  - Other Tracing (controlled temperature is critical)
- Why
  - Prevent unit shut down
  - Avoid piping removal/steam out
  - Eliminate fluid solidification



# High Pressure Steam Turbines

- Why
  - Eliminate
    - Flooding turbine
    - Extensive blade damage
    - Energy loss from high pressure distribution
- Result
  - Decreased maintenance
  - Increased efficiency

# Process Applications

- What
  - Re-Boilers
  - Shell & Tube Heat Exchangers
  - Steam Heated equipment
- Why
  - Prevent unit shut down
  - Avoid process disruptions
  - Increase process efficiency



# Energy

- What
  - Medium Pressure Steam Traps
  - High Pressure Steam Traps
  - Hard to access steam traps
- Why
  - Reduce cumulative monetary losses
  - Eliminate energy waste
  - Decrease CO<sub>2</sub> Emissions

# Benefits of ISA100

- Security
- Integration
- Wireless Coverage
- Scalability
- Installation Time
- Best Manufacturer for Best Application



# CUSTOMER USE CASES

# Turbine Application

- Project Overview
  - Monitored 50 High pressure steam turbines
- Objective
  - Notify of potential turbine issue prior to failure
  - Maintain turbine efficiency
- Results
  - Detected 2 failed closed steam traps
  - Applied corrective actions to avoid blade damage
  - Decreased turbine maintenance (2 reliability issues)
  - Avoided potential process shutdown/extensive outage



# Sulfur Tracing Application

- Project Overview
  - 130 transmitters on steam tracing manifolds
- Objective
  - Continuous operation of sulfur loading station
- Result
  - Detected 17 failed closed steam traps
  - Allowed for immediate bypass of valve
  - Continuous unloading of trucks/train cars
  - Cost mitigation of one event (maintaining loading operations)



# Energy Reduction

- Project Overview
  - 2,600 Medium/High pressure distribution traps
  - Initial failure Rate: 19%
- Objective
  - Reduce Emissions and Steam Usage by 10%
- Result
  - Decreased plant failure rate to 5%
  - Eliminated \$1 Million of Steam loss
  - Decreased CO2 emissions by 40%
  - Put one boiler on standby



# Contact Information

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