

An Innovative Technology Company  
Providing Energy and Emission Reduction Solutions



**GEM<sup>®</sup>**

# Condensate Return System



Since the industrial revolution over 100 years ago, steam has been the backbone of manufacturing, helping to heat, mix, evaporate, distill, brew, cure and generally process materials within all aspects of the production process.

Now steam users are faced with new challenges...

- ▶ Ever-rising production targets
- ▶ Escalating fuel costs
- ▶ Shrinking margins and global price pressures
- ▶ Emission limits and regulations
- ▶ Growing maintenance costs
- ▶ Low steam trap reliability and high failure rates

The GEM Condensate Return System featuring GEM Steam Traps

- ▶ Enhanced efficiency and reliability
- ▶ 10% to 30% reduction in steam costs
- ▶ Permanent energy savings backed by 10 year No-Fail Guarantee
- ▶ Avoided repair and maintenance costs

Condensate receiver vent at a hospital laundry before and after fitting GEM Traps.



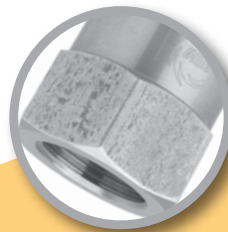
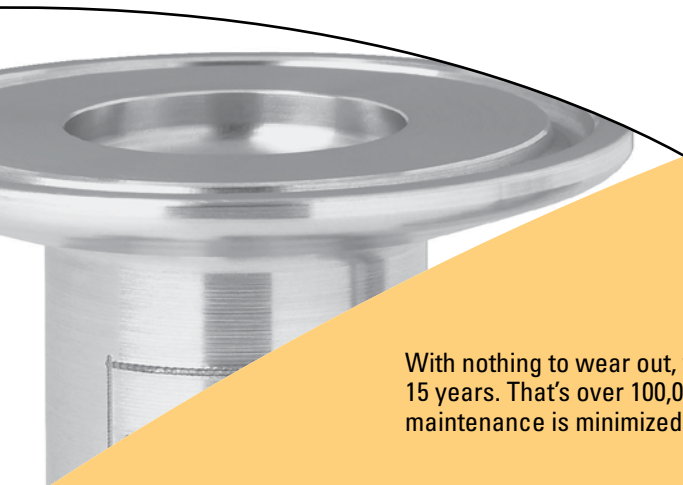
BEFORE GEM Traps



AFTER GEM Traps



*The GEM Trap has changed the way many view steam traps, providing a permanent solution with no moving parts to wear out or fail.*



With nothing to wear out, we have been providing the GEM Trap with a 10 year guarantee for over 15 years. That's over 100,000 units with none returned. Since GEM Traps are guaranteed, maintenance is minimized and the cost of ownership reduced.

## Advantages

### Permanent energy savings

- ▶ 10% to 30% permanent reduction in steam costs
- ▶ Superior design resulting in enhanced efficiency
- ▶ 10 Year No-Fail Performance Guarantee

### Excellent return on investment

- ▶ No moving parts = no trap failures = minimal downtime
- ▶ Simple paybacks typically range between 1 and 2 years
- ▶ Significant operational benefits from avoided repair and maintenance costs

### Ultimate reliability and safety

- ▶ Elimination of water hammer, condensate back-up and/or explosions from failed valves
- ▶ Solid stainless steel construction
- ▶ No "wire draw" and/or wear of orifice

### Increased production

- ▶ Faster system warm up = quicker batch times
- ▶ No back pressure from failed traps
- ▶ Less thermal shock = increased plant reliability

### Minimal maintenance

- ▶ No spares required
- ▶ No kits to fit
- ▶ No endless trap surveys or test equipment and devices required
- ▶ Simple periodic cleaning of strainer and easy-to-clean bodies

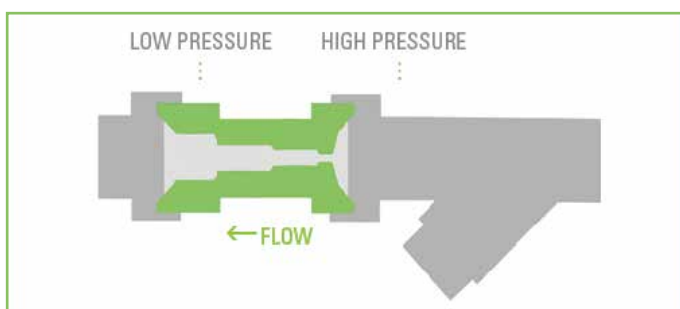
### More control and heat output

- ▶ Capable of operating under a full range of variable load conditions
- ▶ Self regulating vs. opening and closing of mechanical trap valves
- ▶ Constant vs. intermittent condensate drainage

### Superior product and service

- ▶ Full range of traps available
- ▶ Full traceability – each trap has individual serial and batch number
- ▶ Compact size – less heat loss and reduced space requirements
- ▶ Flexible orientation and configurations
- ▶ Tailor made insulation bags – GEM Traps do not need to lose heat to operate
- ▶ Optimal performance guaranteed – GEM Traps are individually sized for your requirements

## Functionality of GEM Condensate Return System

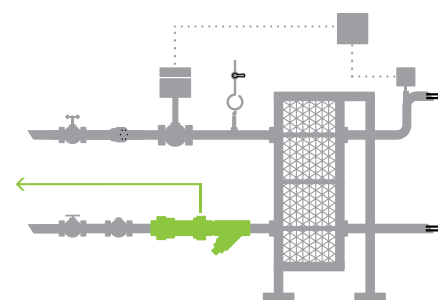


GEM Traps work by using the difference in density between steam and condensate. Condensate is 1,000 times denser than steam and will pass through an orifice much slower than steam.

The slow moving condensate squeezes out low density steam as it approaches the orifice. The high density, slow moving condensate is then preferentially discharged through the orifice, trapping the low density steam behind. The patented "venturi" orifice regulates condensate capacity over the full range of operating conditions.

### Start up

- ▶ Air and non-condensables vent through the orifice at high velocity
- ▶ Cold condensate discharges at a rate of 2 to 3 times running load



### Running load

- ▶ Steam is held back by liquid condensate forming a seal at orifice
- ▶ Hot condensate flows through venturi, moving from high to low pressure conditions
- ▶ A portion of the condensate re-evaporates as "flash" steam, creating localized back pressure
- ▶ The point of flashing moves in the venturi as a function of condensate flow rate regulating capacity in response to varying load conditions

Thousands of GEM Traps have been installed worldwide, permanently cutting costs for blue chip international companies.

- ▶ AES
- ▶ Allergan
- ▶ ArjoWiggins
- ▶ Ascend
- ▶ BASF
- ▶ Baxter
- ▶ Bolthouse Farms
- ▶ Boots
- ▶ Bristol-Myers Squibb
- ▶ British Sugar
- ▶ Cargill
- ▶ Carlsberg
- ▶ CEAT
- ▶ Dayco
- ▶ Diageo
- ▶ Dow Corning
- ▶ DuPont
- ▶ Eastman
- ▶ Ferrero
- ▶ GE
- ▶ GlaxoSmithKline
- ▶ Goodyear
- ▶ Huntsman
- ▶ Infineum
- ▶ IOI Group
- ▶ KNPC
- ▶ Lactalis
- ▶ Mars
- ▶ Merck
- ▶ Mondelez
- ▶ NHS
- ▶ Novartis
- ▶ PepsiCo
- ▶ Premier Foods
- ▶ Roche Group
- ▶ Roseburg
- ▶ TATA
- ▶ UPM
- ▶ Verso
- ▶ Weetabix

### Thermal Energy: Supplying Innovative Award-Winning Energy Recovery, Conservation, Bioenergy and Emission Reduction Solutions

TEI is a full service, design-build firm with engineering accreditation, established in 1986. We have designed and built many energy and emission reduction solutions for our customers.

Our team of professionals is highly experienced in plant and process energy efficiency evaluations and innovative solution development. We conceptualize, design, manufacture and deliver custom solutions which reduce your energy costs, improve energy efficiency and reduce the environmental impact of your facility.

We pride ourselves on working with customers to gain an in-depth understanding of their business, corporate, social and fiscal challenges. With this sound footing, our team of professionals provides complete solutions from initial design concept to installation, to financing and servicing of varied technology solutions.

### Typical applications include:

- ▶ Waste energy recovery (FLU-ACE and other);
- ▶ Biomass and waste steam drying solutions (DRY-REX and other);
- ▶ Steam and condensate system solutions (GEM and other); and
- ▶ Burner/Boiler system improvements.

*Contact Thermal Energy today to discover how GEM® steam traps can revolutionize your company's production efforts!*



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