

Brackett Green[®] Automatic Tube Cleaning System

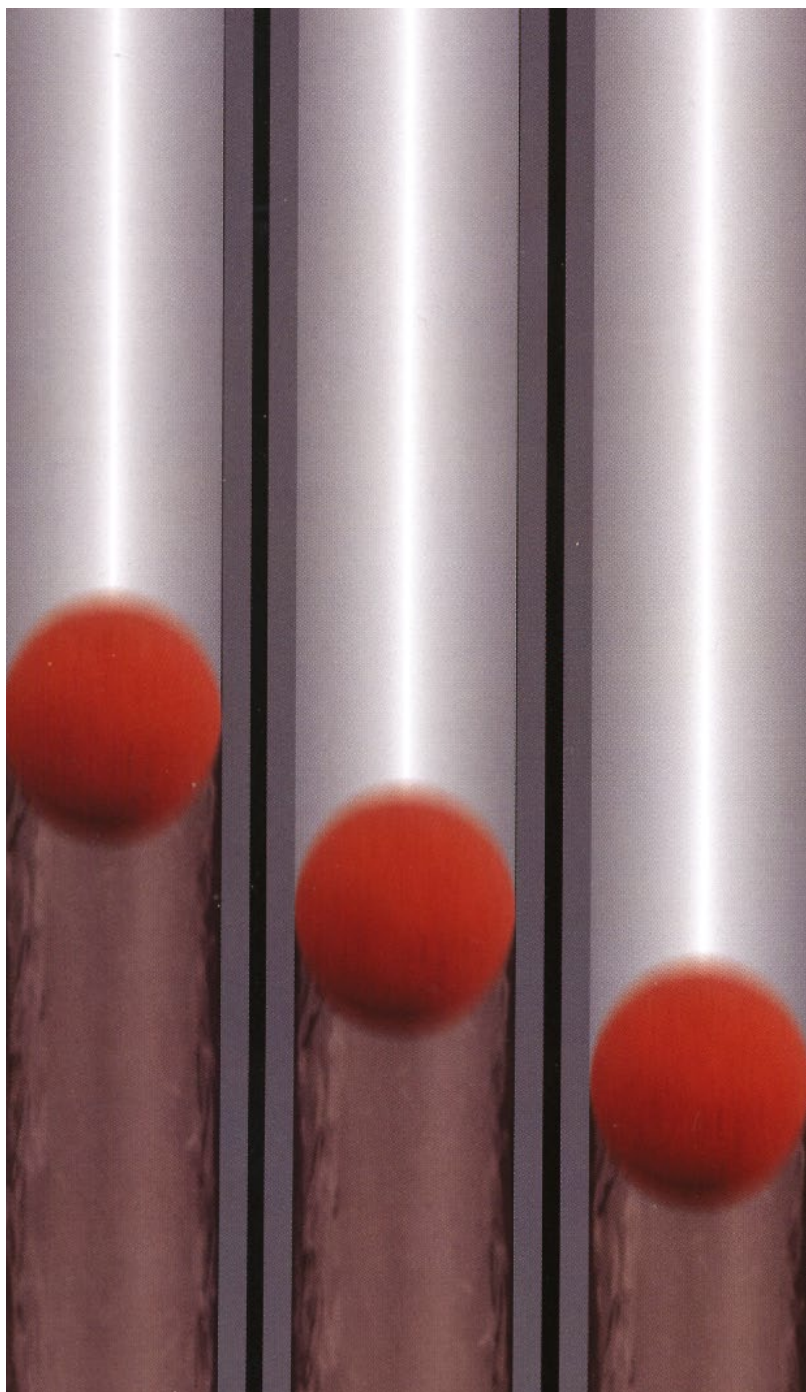
Eliminates micro fouling and scaling in heat exchanger and condenser tubes

Key features & benefits

- Compact design suitable for new installations or retrofit
- Continuous on-line cleaning or pigging of the tubes
- Maintain a higher heat transfer coefficient
- Reduce tube corrosion and tube failure caused by fouling and scaling
- Low pressure drop
- High ball recovery
- Variety of balls for different temperature and process conditions
- Can be manufactured to ASME, Nuclear, Power & Petrochemical industry codes and standards

How we create value

- Custom designed equipment reduces installation costs
- Highly reliable, reducing maintenance requirements
- Designed to meet industry standards
- Ovivo's experience in various applications across a wide range of industries ensures proper application and design



Brackett Green® Automatic Tube Cleaning System



Dual screen ball strainers



Ball recirculation pump skid



Single screen ball strainer



Elastomeric rubber balls

Problems

Micro fouling and scaling in heat exchanger and condenser tubes limits plant efficiency and shortens service life. For power plants, lower efficiency means lower turbine output: the resultant loss of production can be as high as 25%.

Productivity lost during tube-cleaning down time can never be recovered. Mechanical cleaning demands outage time, while chemical cleaning to control fouling or scaling is both environmentally unsound and hazardous for workers. Both are costly, time-consuming, labor intensive, and must be performed over and over again.

A Permanent Solution

The Brackett Green® automatic tube cleaning system (ATCS) puts an end to the perennial maintenance problem of micro fouling and scaling. The ATCS wipes out scale deposits and micro fouling 24 hours a day, increasing reliability, performance, plant output and service life.

Our ATCS soon pays for itself. The ATCS eliminates the maintenance costs associated with offline cleaning, with no need for downtime required by mechanical or chemical cleaning methods. The online ATCS pays for itself through increased heat energy transfer efficiency and higher plant production. It also reduces corrosion, prevents tube failures and eliminates the cost of hazardous, continuous chemical treatment.

How it Works

Ovivo's simple and highly effective Brackett Green automatic tube cleaning system is an innovative solution to eliminate tube contaminants.

The ATCS injects elastomer rubber balls which are slightly larger than the tube diameter into the water supply line so that the flow of cooling water forces them through the condenser tubes. The balls wipe the tubes clean of deposits including silt, scale and biological fouling.

A strainer section in the cooling water outlet extracts the balls and a centrifugal pump moves them into a collector section ready for the next cycle. Balls can be circulated continuously or intermittently to suit the individual plant.

Pressure drop is negligible. A differential pressure monitor displays pressure drop across the strainer section while patented vortex and turbulence promoters at the strainer outlet point ensure ball recovery. The screens can also be backwashed to clear accumulated debris as necessary.

Explanatory diagram

1. Nozzles inject cleaning balls into the system against the flow of cooling water to ensure proper distribution.
2. Custom-built strainers collect the balls and move them through the exit point towards the recirculation point.
3. Non-clogging open-impeller circulation pump adds sufficient pressure to remove the balls from the strainer and return them to the injection point.
4. Automatic ball collector takes balls out of, or releases them into, circulation. The collector also allows quick and easy access for the replacement of worn balls.
5. Optional, self-flushing debris filter removes macro fouling, fibrous and coarse debris from the intake cooling water.

Precision, Custom Design

Sound engineering and meticulous attention to detail ensures trouble-free operation.

Ovivo matches the type, diameter, weight, hardness and surface texture of the balls to the specific needs of your operation, using an appropriate injection

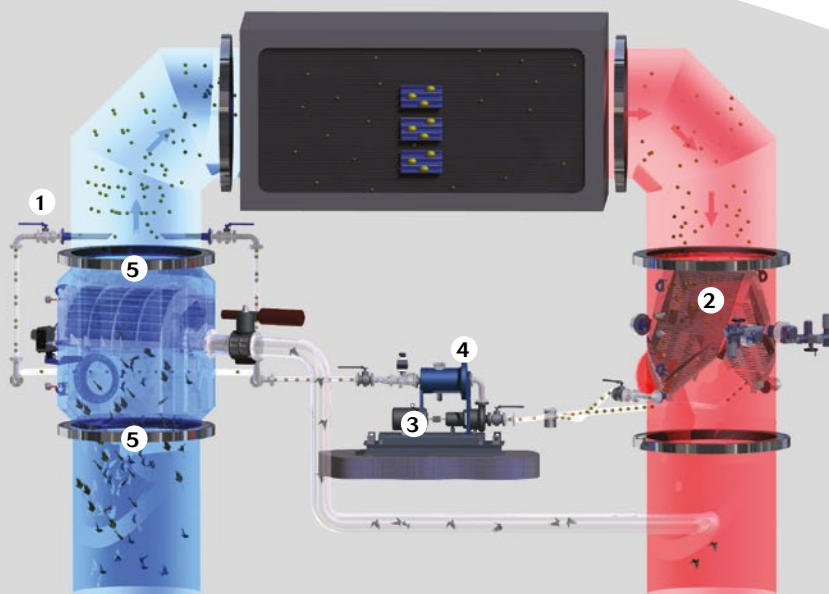
method for proper ball distribution. Every solution is customized to your plant, and Ovivo is able to supply a wide range of systems in different sizes and capacities.

Flexibility has been built in to the Brackett Green automatic tube cleaning system to tackle problems in both high and low temperature applications and in all types of tubes (including stainless steel, titanium and copper-based alloy).

Plant engineers can select continuous, intermittent or manual cleaning cycles. They can also monitor the number of balls in circulation to judge the quantity of worn balls which will no longer be effective.

Performance

Automatic tube cleaning technology has improved plant efficiency for more than 4000 companies worldwide. Quietly dependable, the Brackett Green automatic tube cleaning system's performance has been proven in the field for more than two decades across a wide range of industries including power generation (fossil, nuclear, geothermal and cogeneration), processing, refining, petrochemical and desalinization.



Typical cost saving comparison

Cost Savings

| | |
|----------------------------|-----------|
| System cost for four units | |
| Equipment and installation | \$500,000 |
| Annual operating cost | \$3500 |

Annual savings

| | |
|--|--------------|
| Reduced steam consumption | \$950,000 |
| Elimination of shutdown and additional available power | \$2, 500,000 |

Condenser Cleanliness Factor Vs. Time

70% is the Design C.F.

