Automatic Tube Cleaning System

Problems in Condenser

Problems in condenser

- Blocked condenser tubes *are* costly in many ways.
- The operating efficiency drops and energy consumption rises – a big consideration since system operation eg in a HVAC system accounts for up to 70% of the energy expense in a large facility!
- 0.3 mm of sludge in the fouled tube will typically cause a double-digit percentage rise in the system's energy consumption.
- The inefficiency also creates greenhouse gases (GHGs),

Heat exchanger's tubes get clogged with:

- **Macrofouling:** mussels, fish, algae, debris, leaves, grass, stones or internal construction parts of cooling towers.

- **Microfouling:** mud, sand, clay, microorganisms, bioslimes, corrosion products and inhibitors.

- **Scaling.**

The Problem

Offline & Online Solutions

Several systems exist that combat the problem of condenser tubes fouling—offline or online.

Offline solution

- The offline solution requires shutting down the system for the cleaning.
- It uses chemicals or mechanical means to do the job. Using chemicals that are harmful to the environment requires extreme safety measures and specialized disposal.
- Between cleaning treatments, fouling accumulates and hampers performance.
- Moreover, the cleaning process becomes increasingly inefficient over time.
- These drawbacks make the offline methods of cleaning the condenser expensive, cumbersome and inefficient.

Online solution

- The online method, on the other hand, is both environmentally sound and extremely cost effective.
- Online cleaning doesn't require shutting down since it is an ongoing process.
- Fouling doesn't accumulate because the cleaning procedure is constantly taking place.
- n short, online condenser cleaning is the most resourceful option available today.

Energy Efficiency Solutions

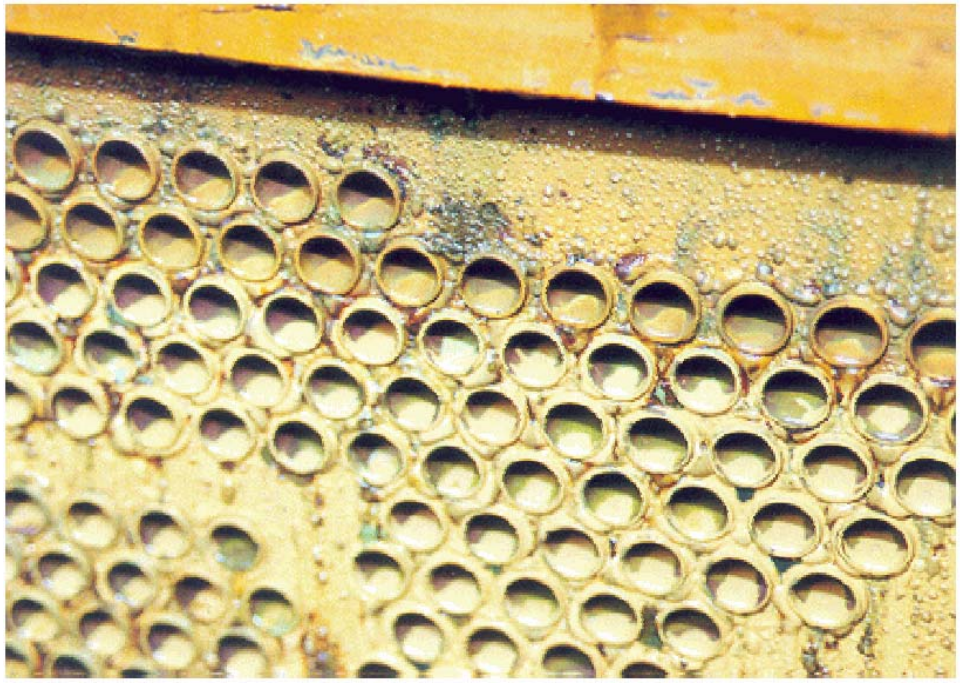
ATCS-Industrial

Automatic Tube Cleaning System for Industrial Plants and Power Stations

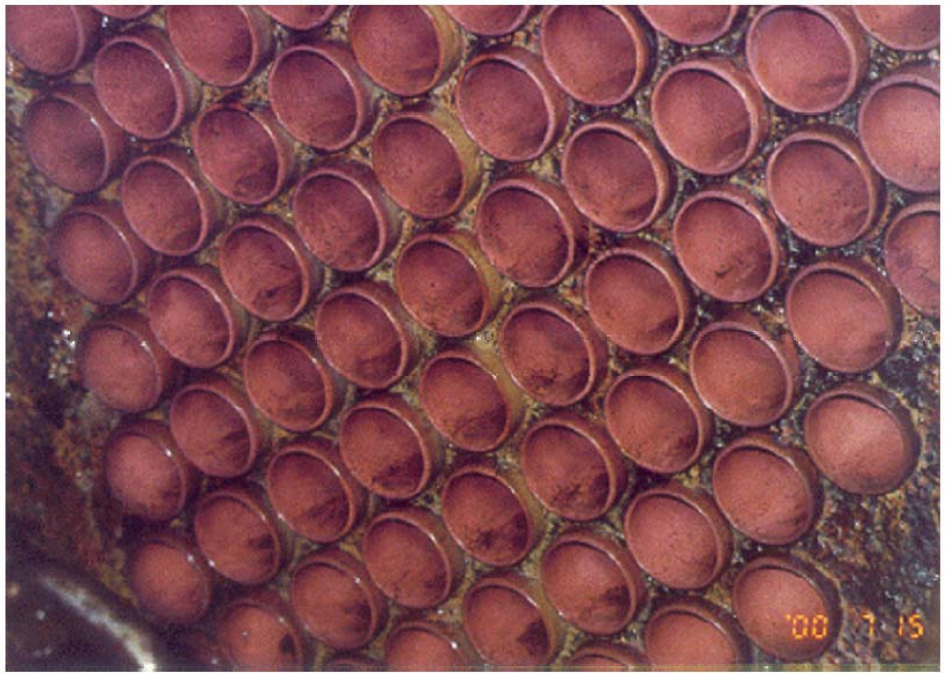
ATCS-HVAC

Automatic Tube Cleaning System for HVAC Condensers

Results

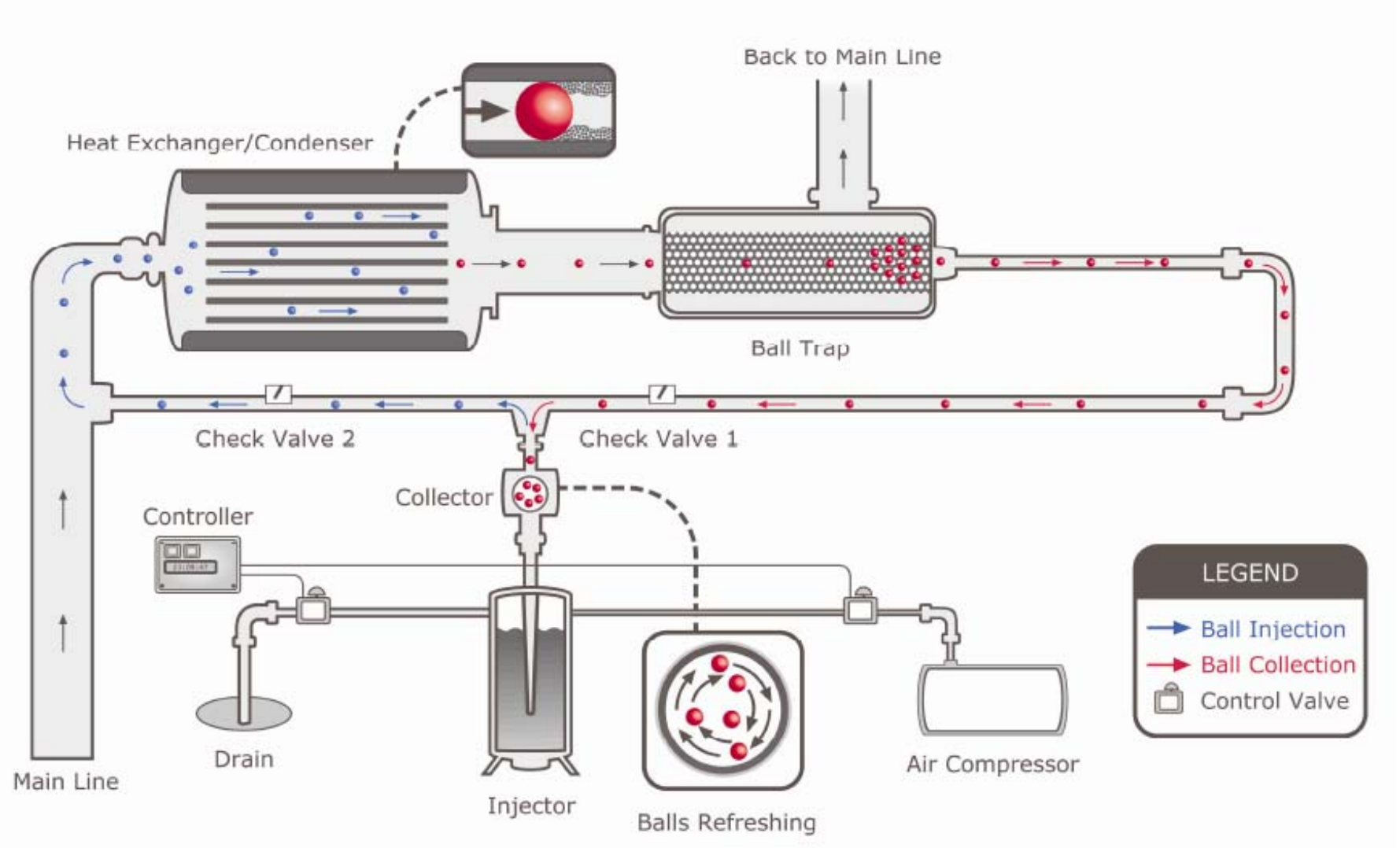


Tube before installation of Auto ball cleaning system



Tube after installation of Auto ball cleaning system

ATC System - Air Pressure Driven



Wide range of application

- Bulk fluid/ tube skin temperature : from -60 to 280 Dec C
- Fluid specific gravity of 0.3 to 11
- No limit to fuel pressure
- Reliable, efficient operation, every hour of every day
- Easy automatic operation with low manpower requirement
- Complete integration with existing system in a matter of hours
- Single-point installation effective for the entire facility
- "Green" solution doesn't use chemicals or produce toxic waste
- User-friendly software for on-line tracking of efficiency and savings

Thermax ATCS Vs Competition

	Thermax	Competition
Ball Trap	Patent – 3.5 times pipe cross section	No patent – 1.5 times pipe cross section
Ball Injection	Less then 4 sec	One by one
Ball lost	ZERO	60% in 4-6 weeks
Tube cleanest factor	more than 90%	Only 25% center tubes

Some of our Customers

Case Studies

Case Study 1 - Energy Saving exercise of Automatic Tube Cleaning System for THE PARK LANE, HONG KONG

The objective of this report is to calculate the energy saving of the chiller that TCS was installed. It is then used to evaluate the Return on Investment for chiller #2 and chiller #3 that TCS had not been installed yet.

ANALYSIS APPROACH

1.COP Comparison Approach : The improvement of energy efficiency in energy management for chiller is concerned with the Coefficient of Performance (COP). The approach used in this report to study the improvement of COP after the installation of TCS.

2. *Temperature Difference Comparison Approach :* On the other hand, the effectiveness of TCS can be easily understood by comparing the Condenser Refrigerant Temperature (CRT) & Leaving Condensing Water Temperature (LCWT) Differences.

COP Comparison Approach

- According to figure, the COP of Chiller #1 with TCS system is generally above that of Chiller #3 without TCS system.

- By using mathematical equations, the calculated average COP for Chiller #3 is 3.7 and the average COP for Chiller #1 is 4.2.

- The average percentage of energy saving = 11.9%

Temperature Difference Comparison Approach

- The effectiveness of ATCS can be easily understood by comparing the Condenser Refrigerant Temperature (CRT) and Leaving Condensing Water Temperature (LCWT) Differences.
- The average temperature difference (between Condenser Refrigerant Temperature & Leaving Condensing water temperature) dropped to 3.8 Deg C after TCS installation, whereas the dT is 6 Deg C on Chiller without TCS installation
- It drops about 36.7% when comparing to the chiller #3 that without TCS installation.
- The narrowing in temperature difference implies the heat transfer efficiency between condensing water and refrigerant was greatly improved.

Conclusion

- In the COP comparison approach, the percentage of energy saving was 11.9% and the average COP was improved from 3.7 to 4.2.
- In the temperature difference comparison approach, the average temperature difference for Chiller #1 (with ATCS) is only 3.8º C while the average temperature difference for Chiller #3 is 6.0º C (without ATCS).

Thank You!!