WMU ARCADIA STUDENT HOUSING

CASE STUDY

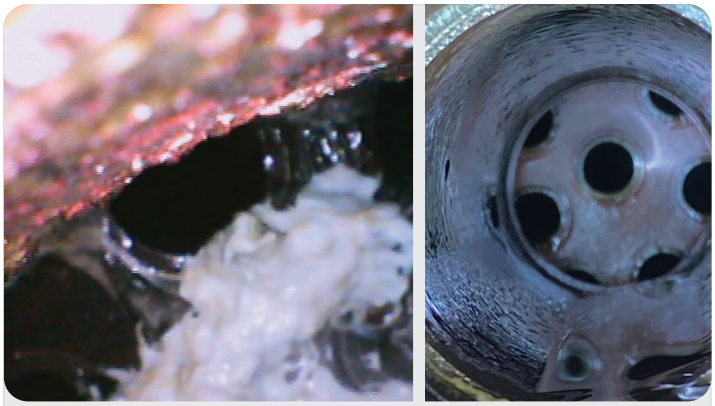
INDUSTRY Education

CUSTOMER Western Michigan University

LOCATION Kalamazoo, Michigan, USA

BACKGROUND In early 2021, Western Michigan University (WMU) opened its newest student housing building, Arcadia Flats, an apartment-style living center with 197 units.

PROBLEMS TO SOLVE Within weeks of the first residents moving into the Arcadia Flats building, the WMU facilities team was dealing with maintenance issues caused by the building's poor water quality. Strainers, valves, fixtures, and other equipment were frequently plugging. The tube bundles within heat exchangers were fouling just 7-10 days after being cleaned, causing reduced heat transfer and driving up energy costs for the building. Complaints about the lack of hot water from residents on the top floors were anticipated. Standard chemical treatments did little to improve the building's water issues.



Buildup on heat exchanger tubes after 2 months use, and no buildup after continued use of nanobubble generator.

> **"The bundle would close to the point of failure if we didn't clean it every 10 days or so. Whenever we pulled the head off for cleaning, the diameter of the tubes would be 3/8" or less."**
>
> — **STEPHAN MACOMBER**, WMU SUPERVISOR IN MAINTENANCE SERVICES

SOLUTION

In July 2021, an Armstrong Nanobubble Generator was installed on the building's domestic hot water system to effectively treat the water flowing through the building's steam-to-hot-water recirculation system. A simple, sidestream installation of the smallest Armstrong Nanobubble Generator fulfilled all requirements.

SIGNIFICANT RESULTS

Ten weeks after installation of the Armstrong Nanobubble Generator, the heat exchanger tube bundles had not fouled once. Because the presence of nanobubbles naturally softens the water and prevents calcium buildup, recently installed valves remain clean while the older valves become cleaner over time.

Since installing the Armstrong Nanobubble Generator, WMU's maintenance team has not received a single call to service the building's hot water system and is no longer required to clean the bundle every 10 days to prevent failure. Instead, WMU has moved to yearly cleaning, which has eliminated more than $17,000 in annual equipment cleaning costs alone.

NEXT STEPS

After witnessing the benefits in Arcadia Flats, WMU plans to add the Armstrong Nanobubble Generator to domestic hot water systems in student housing facilities across campus. WMU has plans to use the Armstrong Nanobubble Generator in additional applications, such as closed loop shell-and-tube and plate-and-frame heat exchangers.