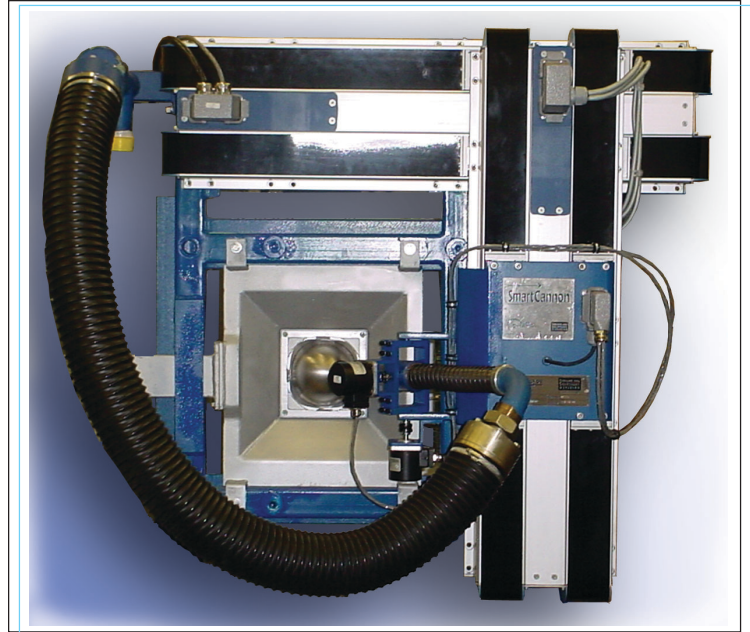


A SmartClean™ Solution

Introduced in 1998 to the North American market, our revolutionary water cannon furnace cleaning systems have proven themselves in more than 55 boilers already (world wide over 150 systems installed). Water cannons have mostly replaced the older water lances because they provide a fully controlled and intelligent furnace cleaning solution to all boilers firing problematic fuels. Furnace walls are cleaned completely, only wherever and whenever necessary. The new SmartCannons™ now offer even more:

- New linear drive modules with DC drive provide more torque and speed range, wear reducing ball screws, all components completely sealed off against ash and dust without bellows.
- New position sensors target the water jet where it counts: right at the lance tube, no proximity switches or reference positioning are required
- New wall boxes with UniBall™ eliminate the need for covers and are also suitable for positive pressure furnaces.

Note: Various patents pending



The Water Cannon Success Story

While pioneered already in the early 1990's in Europe by Clyde Bergemann watercannons have only been introduced a few years ago to the North American market. During that short period, our water cannons have almost replaced conventional water lances and become the cleaning system of choice to all operators of dirty fuel firing boilers. Unlike water lances the water cannons clean almost 100% of the furnace walls. Burners, however, and other prohibited zones can be easily excluded from the cleaning zones which incidentally, the operators can modify via "point and click" at any time. Now installed in more than 55 US and Canadian boilers our water cannons have proven to be the most effective tool for increasing heat flux in the furnace significantly reducing furnace exit gas temperature (FEGT) and increasing overall boiler efficiency and power generation output.

Experience Counts

With more than 600 cannons installed worldwide Clyde Bergemann is the only supplier that offers a **proven** water cannon system that works effectively with minimal risk of damage to the boiler tube. With our experienced ten year plus team in place we have a significant advantage over other suppliers who may be at the beginning of a longterm learning process. Ask us for our reference list or to set up site visits. Attend our annual conference to learn the most you can by meeting other users.

Advantages:

Low Maintenance Costs

- New UniBall™ wall seal for negative and positive furnace pressure, no bellows or covers needed
- Fully enclosed, integrated linear drives
- Quick exchange of linear drive modules

Fits into Tight Locations

- Compact design with short integrated hose
- Stable aluminium frame structure

Precision Cleaning Performance

- Exact positioning through stable structure, strong DC drive motors, precise ball screws and linear guides.
- Absolute position control with two resolvers, always read the exact position of the lance, also after a loss of power. 100% repeatability. No proximity switches.

Technical Data:

Cleaning Parameters

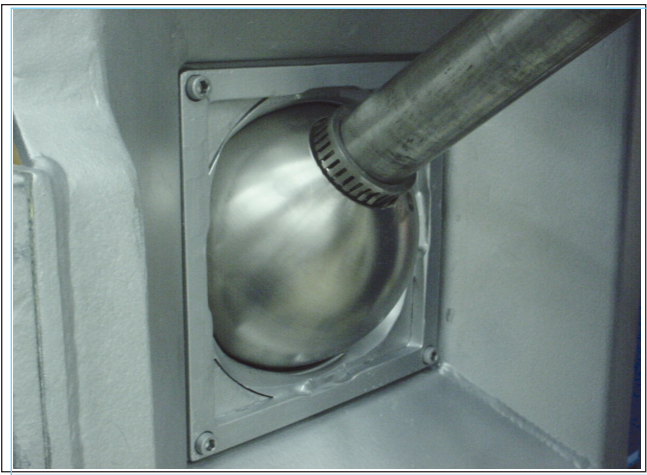
- Blowing angle up to 110° in X and Y axis
- Effective length of blowing jet: up to 140'
- Water pressure up to 380 psi
- Water consumption up to 350 GPM

Dimensions

- Size: 43 x 43 x 26 in
- Weight: 200 lbs

Drive System

- DC motor unit includes brake and reduction gear set
- 0.33 HP, 24 or 48 V DC service

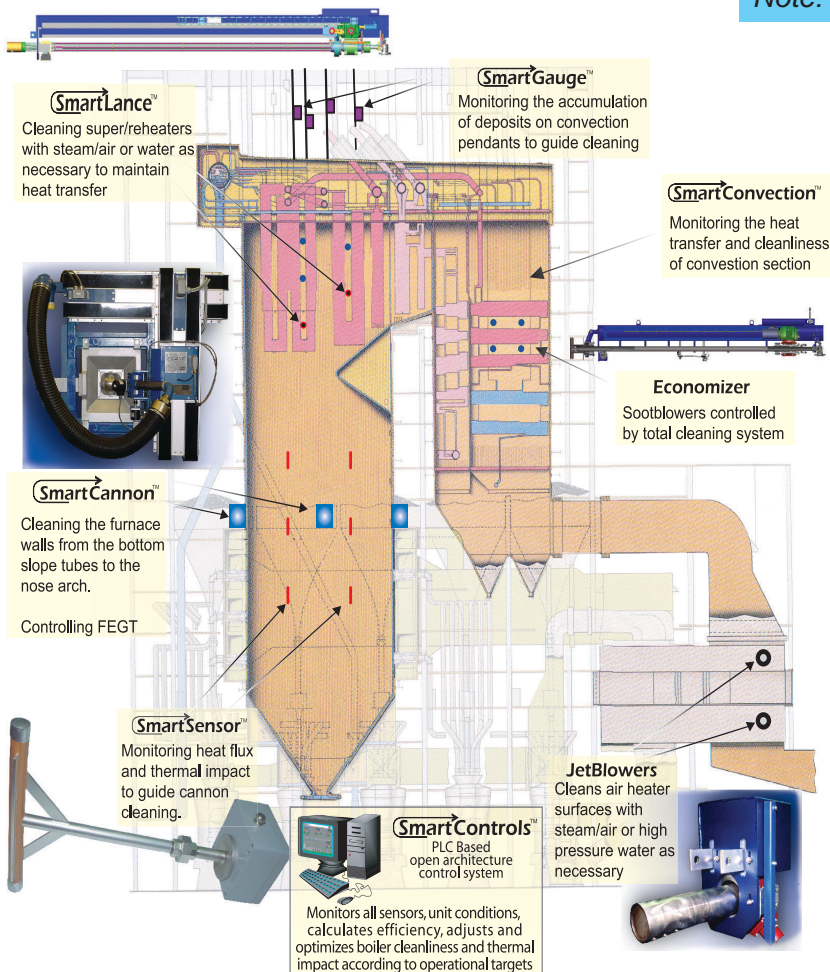


UniBall™ Cannon Wallbox

Each SmartCannon™ is now equipped with Clyde Bergemann's new UniBall™ ball-type sealing wallbox. Contrary to the old style cardan type pivoting devices the UniBall™ provides a tight seal and eliminates covers. The balls are made from a high temperature stainless steel and have a ceramic coating to withstand wear for a long time. UniBall™ cannon wall boxes are suitable for balanced draft and positive pressure boilers.

Note: Patent pending.

SmartClean™ System Integration



Clyde Bergemann has developed a total boiler cleaning system incorporating sensors, sootblowers, water cannons and intelligent algorithms for interpreting and optimizing cleaning systems. The SmartLance™ is one of the component pieces used to achieve maximum boiler performance in specific cases requiring superheater or reheater performance enhancement. In its recommended configuration, SmartLances™ are integrated with a SmartConvection™ System incorporating SmartGauge™ and SmartControls™ technology. The SmartGauges™ and SmartConvection™ obtain data and analyze cleaning requirements within each section of the superheater. The SmartControls™ system then activates the best cleaning device for the job, defining an exact pressure, speed and *media mix* for each zone in question.