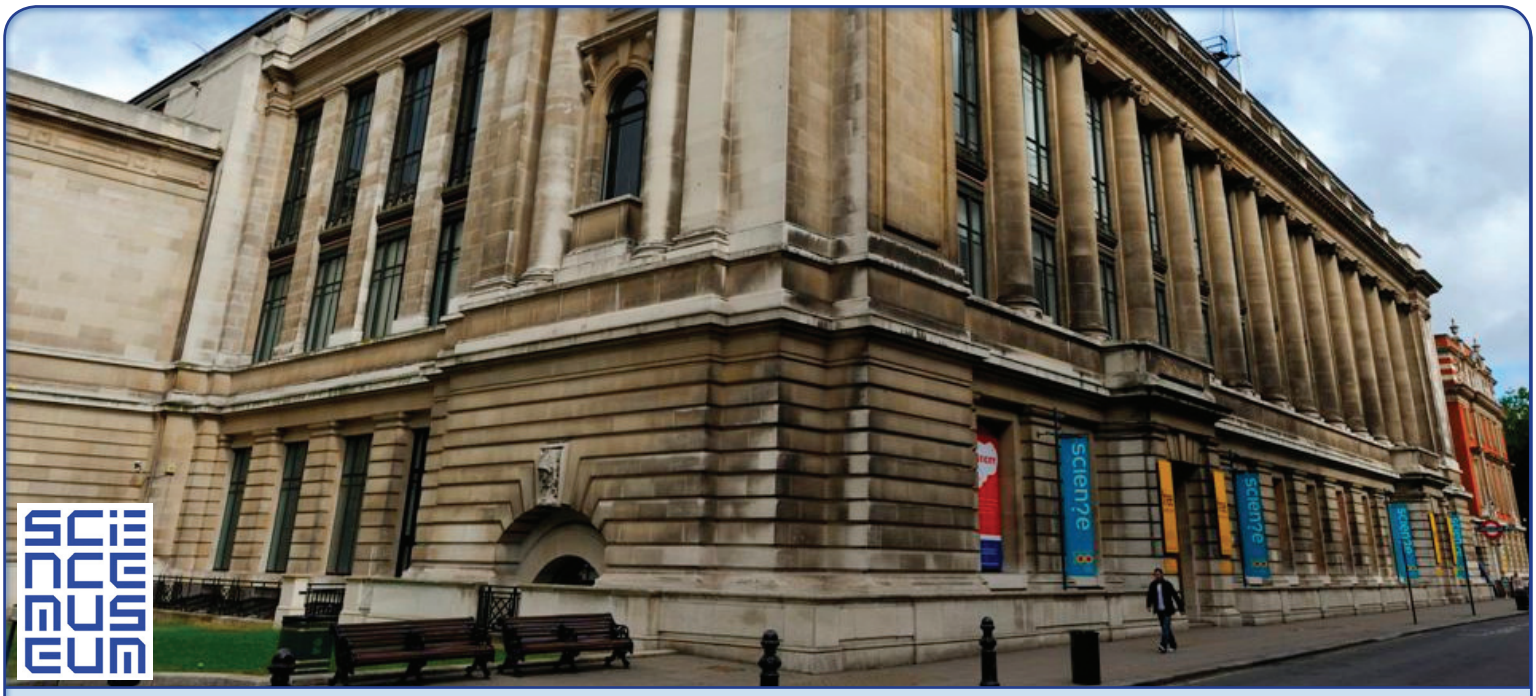



# London Science Museum Upgrades Boiler Room With Cutting Edge Technology

Autoflame were invited to make recommendations to improve the efficiency and reduce fuel usage for the boiler room at the Science Museum in London. Following a survey it was agreed that the best way forward would be to replace the existing burners, and Limpsfield Burners with Autoflame controls were specified for the energy saving project.

Autoflame identified that there was no air/fuel ratio control system on the existing burners and that they used a mechanical linkage to control air and fuel delivered. Without a means to commission air and fuel independently at different firing rates combustion performance efficiency is compromised and restricted by the physical constraints of the linkage mechanism. Linkages are prone to wearing and failure. Over time the inaccuracies of linkage control and wear within it significantly reduce the efficiency of the overall combustion process.

The Science Museum decided to upgrade two out of the five boilers with Limpsfield Burners as a trial. This burner manufacturer offers a Combustion Performance Guarantee that the burners will be set up at no more than 3% $O_2$ throughout the firing range and zero CO. The Limpsfield Burner is engineered to operate at low excess air levels throughout the firing range to improve efficiency. To give you an idea 3% $O_2$ is equivalent to 15% excess air, and by increasing the $O_2$ to 5% the excess air is increased to 28%

The greater the amount of excess air, the greater velocity the hot gases are passes through the boiler. This reduces the residency time of the hot gases through the boiler, increasing flue losses and increasing the exhaust temperature, therefore heating the atmosphere rather than the boiler water . By reducing the excess air this slows the speed of the hot gases passing through the boiler. This allows more time for the hot gases to transfer heat through the boiler furnace wall and boiler passes into the water. Therefore allowing more useful heat from the flame and combustion gases. This has an added benefit of reducing flue losses allowing us to use less fuel to get the required boiler heat output.

## Existing Equipment:

Viesmann Paromat & Simplex Boilers

## Solution:

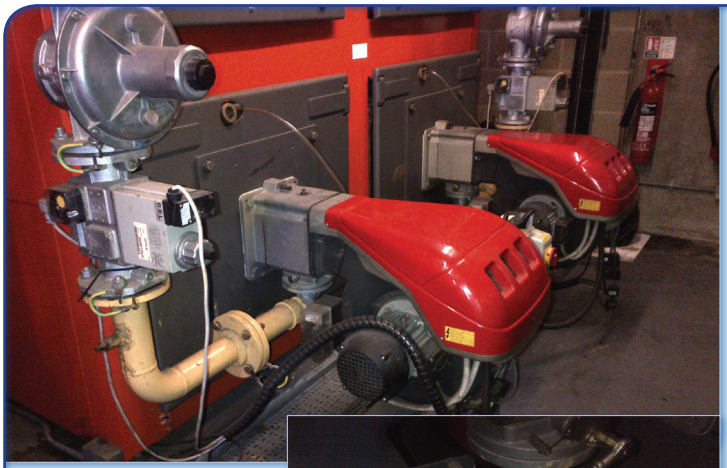
Limpsfield LP2/1465 with integrated Autoflame Mini Mk7 Controllers

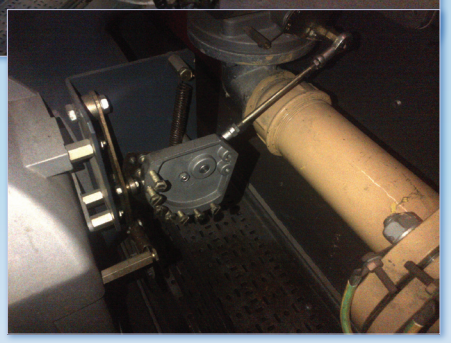
## Benefits:

- Guaranteed 3% $O_2$ emissions (often less) with zero CO
- 10-12% fuel usage reduction
- Reduced maintenance costs
- Lower turndown ratio resulting in reduced cycling

CASE STUDY

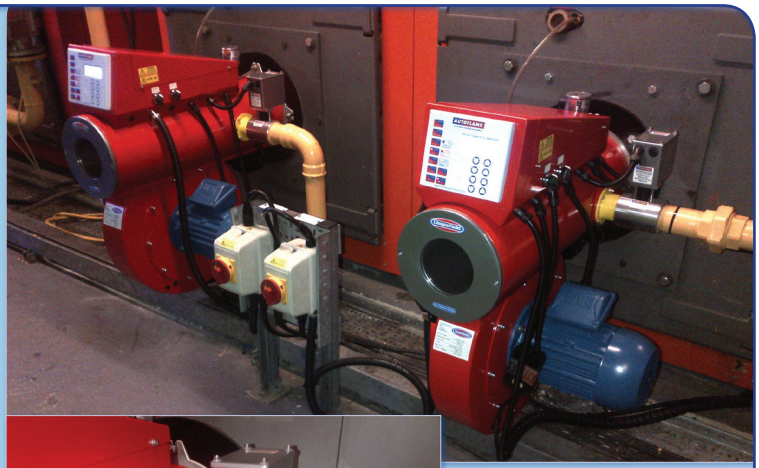
AUTOFLAME®





Above: Non-modulating burner with excess air.

Right: Mechanical linkage.



Above: New Limpsfield burners.

Left: Autoflame servo motor replaces linkage.

## Before:

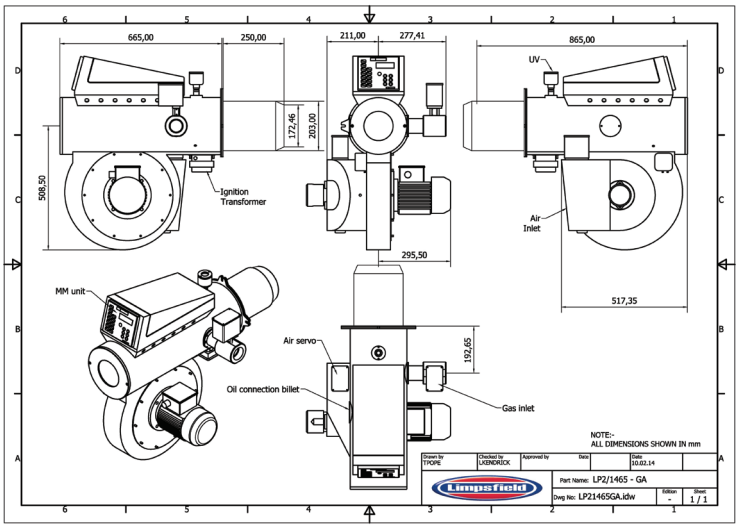
- Mechanical linkage-based system
- Complex to maintain
- System is prone to degrading performance due to play in linkage over time (hysteresis)

## After:

- Servomotor-based system
- Built-in controller simplifies installation/ maintenance and reduces labour time
- System will operate to commissioned settings for years without adjustment

The installation went very well and was completed ahead of schedule. The Science Museum now intend to upgrade the other 3 burners; the energy savings achieved by the new equipment will pay back the initial investment for all 5 burners in less than 5 years.


*Autoflame operates worldwide with 60+ technology centres performing installation and support. Founded in 1972, Autoflame is a British manufacturer based near London. It ensures industry-leading quality control and innovation by performing in-house R&D, engineering, software development, manufacturing production, and technical support.*




*Project General Assembly Drawings*

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