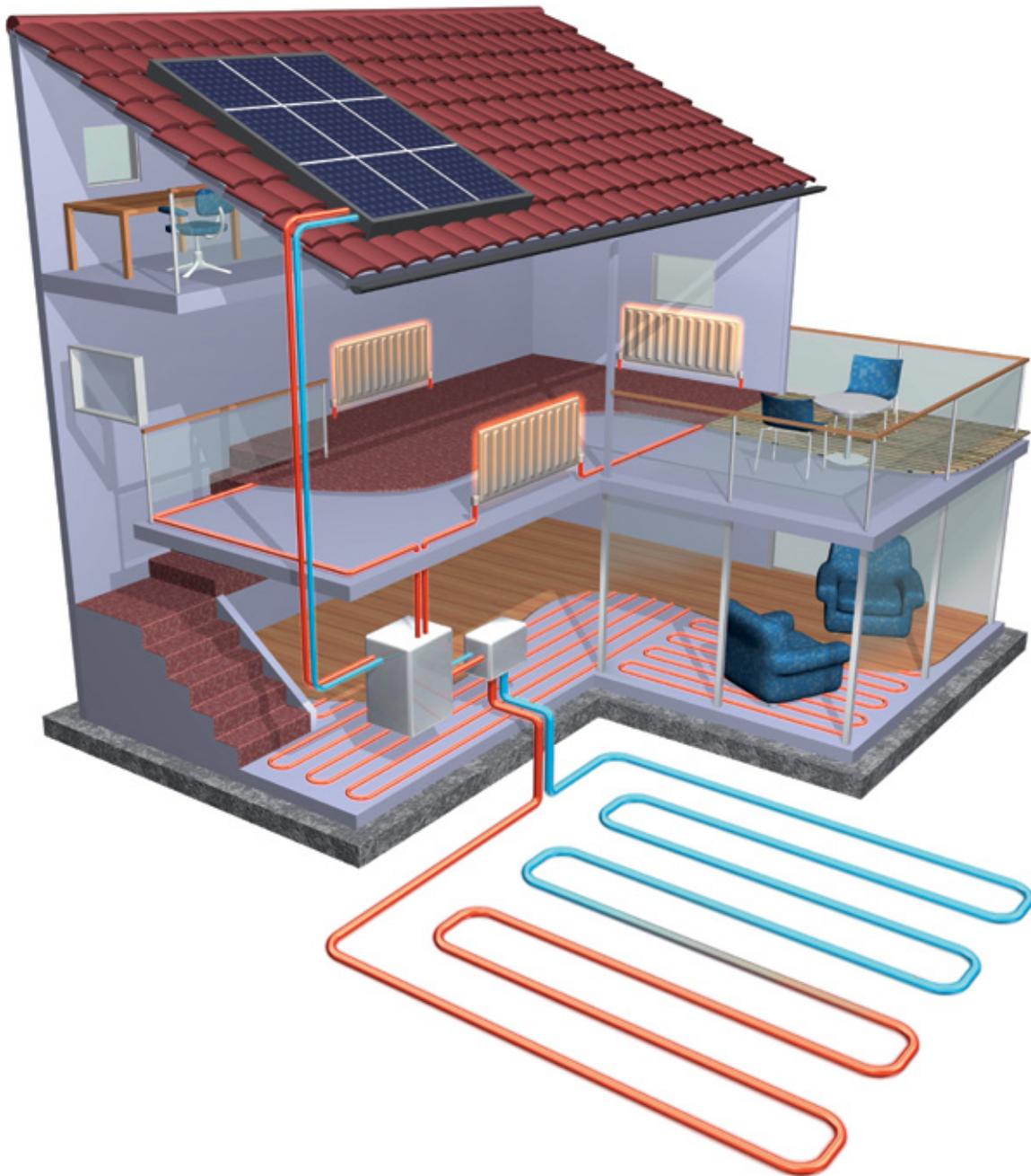


# Energy efficiency experts



**An independent study into improving heating system efficiency with Sentinel**

**GASTEC**  
at **CRE**

[www.sentinel-solutions.net](http://www.sentinel-solutions.net)

**SENTINEL**  
EXPERTS IN ENERGY EFFICIENCY

# Independent confirmation

## Flushing with a Sentinel cleaner combats central heating inefficiency and protects the environment

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### Overview

Independent research clearly demonstrates Sentinel's products help to:

- RESTORE AND MAINTAIN SYSTEM EFFICIENCY
  - REDUCE GREENHOUSE GASES AND EFFECTS OF GLOBAL WARMING
  - REDUCE GAS USAGE AND COST OF ENERGY BILLS
  - PROLONG THE LIFE OF RESIDENTIAL HEATING SYSTEMS IN THE UK AND EUROPE
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### Background to research

On behalf of Sentinel, Gastec@CRE - the largest heating research body - has carried out the first ever independent research programme into the benefits of chemical water treatments for domestic heating systems.

### Reason

The research was undertaken in order to gain a greater understanding of the problems that can occur in heating systems due to inadequate cleaning and treatment, and to quantify any resultant loss in energy efficiency.

- THE RESEARCH HAD TO QUANTIFY ANY GAIN IN EFFICIENCY THAT COULD BE DIRECTLY ATTRIBUTED TO THE CORRECT APPLICATION OF A SENTINEL CLEANER AND AN INHIBITOR.
- WHAT IS MORE, THE RESEARCH COULD ONLY RELATE TO THE USE OF SENTINEL PRODUCTS, RATHER THAN CHEMICAL WATER TREATMENTS PER SE, SINCE MANY OF THE PRODUCTS IN THE MARKETPLACE ARE RECOGNISED AS BEING OF VASTLY INFERIOR QUALITY, WITH VERY LITTLE ACTIVE CHEMICAL INGREDIENT.
- SOME PRODUCTS ARE AS MUCH AS 97% WATER, WITH JUST 3% CHEMICAL CONTENT.
- THESE PRODUCTS COULD NOT BE EXPECTED TO ACHIEVE THE BENEFITS THAT CAN BE DEMONSTRATED BY QUALITY PRODUCTS WITH A FAR HIGHER PERCENTAGE OF THE ACTIVE INGREDIENT.

### Purpose

The research programme was commissioned to coincide with the revision of the new Building Regulations for Conservation of Fuel & Power (Approved Document L – England and Wales), which came into full effect in April 2006 and was supplemented by the Domestic Heating Compliance Guide published by the Office of the Deputy Prime Minister.

- PART L COMPLIANCE GUIDE SPECIFICALLY REQUIRES THE USE OF CHEMICAL INHIBITORS FOR NEW-BUILD HEATING SYSTEMS AND IN CASES WHERE A NEW BOILER IS FITTED TO AN EXISTING SYSTEM.

The guide says:

**“Central heating systems should be thoroughly cleaned and flushed out before installing a new boiler. During final filling of a system, a chemical water treatment formulation should be added to the primary circuit to control corrosion and the formation of scale and sludge.”**

### The facts

#### Step 1:

We based the project around a purpose-built replica of a simple domestic installation, comprising an 11kW condensing boiler and five radiators at two levels.

The system was then progressively fouled with sludge taken from existing central heating systems.

The effect this had on thermal efficiency was then measured.

#### Step 2:

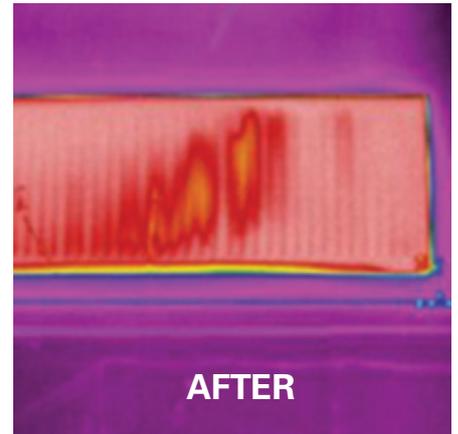
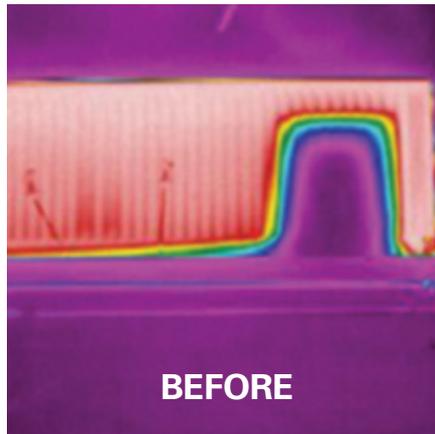
The next step was to fit a new boiler to the system and measure the new efficiency level.

This is the equivalent of retrofitting a new boiler without power flushing the system.

#### Step 3:

The system was then power flushed and, again, the performance was measured.

Finally, Sentinel X100 inhibitor was added and a long-term study of the performance of the system was undertaken.



## What the research demonstrates

GASTEC's research confirms that sludge build up in radiators on a normal domestic heating system can reduce overall effectiveness by as much as 15%.

- PROPERLY CLEANING A SYSTEM USING A QUALITY CHEMICAL ADDITIVE TO BREAK UP SLUDGE DEPOSITS, COMBINED WITH A POWER-FLUSH OF THE SYSTEM, WILL RESULT IN GREATER UNIFORMITY OF RADIATOR TEMPERATURE.
- THIS REDUCES THE RISK OF SYSTEM HYDRAULIC IMBALANCE, LEADING TO AN INCREASE IN OVERALL BOILER EFFICIENCY OF 2-3% – AN INCREASE SUBSTANTIAL ENOUGH TO TURN A BOILER EFFECTIVELY OPERATING WITHIN SEDBUK BAND 'B' (BETWEEN 88-90%) INTO AN OPERATIONAL BAND 'A' BOILER.

## Conclusions

Sentinel chemical water treatments offer a very inexpensive way of bringing systems up to a better standard of operation, whilst reducing fuel bills and cutting CO<sub>2</sub> emissions.

- WITH BRAND NEW BOILERS, OPERATING CLEAN SYSTEMS CAN MAKE THAT IMPORTANT 2-3% EFFICIENCY DIFFERENCE THAT MAKES THEM ULTRA EFFICIENT.
- THIS ALSO FURTHER REDUCES FUEL BILLS AND MAKES AN EVEN GREATER CONTRIBUTION TO LOWERING EMISSIONS.
- REPLACING THE BOILER WITHOUT CLEANING THE WHOLE SYSTEM DID NOT RESULT IN ANY IMPROVEMENT IN EFFICIENCY.

**“We now have indisputable proof that using the correct chemical water treatments, in conjunction with a quality power flush system, such as our Sentinel JetFlush 4 unit, has a significant and measurable effect on energy efficiency in domestic heating and hot water systems.”**

Sentinel's Sales Director John Lynch



# ALSO AVAILABLE

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## Sentinel Solar Range

Bespoke solutions for continued maintenance and thermal efficiency of solar collector heat transfer circuits, including thermal fluids, cleaners and test kits.



## Sentinel Heat Pump Range

Sentinel has created a total solution for the maintenance and protection of Ground Source and Air Source heat pump systems, including thermal fluids, sanitiser and biocide, cleaners, and test kits.



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