Product category briefing: heating water additives

In a conventional wet heating system, heat from combustion is transferred within one or more boilers to the system water, with a small proportion (typically under 20%) being lost as heat in the hot exhaust gases. Those exhaust losses are minimised by optimising the air:fuel ratio and cleaning the heat transfer surfaces in the boiler.

Having absorbed as much combustion heat as possible in the boilers, the system water circulates through the building, delivering heat to the space and returning at lower temperature to be reheated. The amount of heat released into the space over a given period (including casual gains) must balance the amount lost to the environment in ventilation air and via conduction through the building fabric.

Improved heat transfer within the heat emitters would result in increased output; but increasing output beyond what the building currently needs would cause overheating. The control system will therefore intervene to balance heat output to the building's demand for heat, which is entirely determined by prevailing conditions, the characteristics of the building envelope, and the (presumed constant) casual gains. In short, additives will not affect the system's heat output.

By contrast, improved water-side heat transfer does have a beneficial effect within the boilers. A greater proportion of combustion heat will be absorbed by the system water, and less will be left to heat the exhaust gases. As a result exhaust temperatures will fall. This is a measurable effect through which the saving in fuel can be quantified. Assuming moderately high initial exhaust temperatures, the plausible limit is of the order of 6% and indeed in already-well-maintained installations the scope for savings will be considerably less.

There are people selling additives which supposedly improve heat transfer beyond what is achievable through good maintenance. They are actually peddling common chemicals such as antifreeze or detergents, repackaged at inflated prices, and are exploiting the fact that most potential customers do not have enough scientific knowledge to expose the exaggerations in their claims. Their claims are characteristically supported by the results of suspiciously indirect test methods which, being open to many sources of error and uncertainty, provide a pool of erroneously favourable results that they can promote while concealing the adverse ones. Rarely if ever do they provide credible evidence based on the effect on exhaust temperature under controlled conditions.

The salesmen often have no scientific or technical training and believe their own promotional material. Sometimes they are themselves the innocent victims of unscrupulous franchisors. Either way they are motivated by profit with no respect for the truth, and their products are worthless compared with diligent maintenance.

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