Product category briefing: boiler anticycling controls

In commercial heating boilers fitted with on/off burners, the proportion of the time that the burner needs to fire depends on the heat load at the time. At full output the burner would need to run continuously but at part load it will cycle on and off to maintain the boiler flow temperature within a set band.

Avoidable energy losses may occur related to the number of firing cycles. There are two main scenarios: the first is where the burner is of the “forced-draught” type using a fan to introduce combustion air. Here, as a precaution, in each firing cycle fresh air is pumped in for about a minute to purge the combustion chamber prior to the fuel being introduced and ignited. This purge air flushes heat from the system which then needs to be made up during the ensuing firing cycle.

The second scenario concerns boilers with “atmospheric” burners and cast-iron heat exchangers. These have no purge cycle as such but instead will continue to dissipate stored heat after the burners go off, by forcing the water circulation pump to continue to run for a short while even if it is not needed. Like air purging, over-running is also wasteful, albeit the excess heat goes into the building where it may be of some use.

Boiler anticycling controls are designed to reduce purge and over-run losses. They work in different ways but the effect is the same: by increasing the time between firing cycles they reduce the number of starts and stops and thus the associated per-cycle losses. Indeed tests have shown that at low load, when purge losses may account for a significant proportion of boiler fuel consumption, the savings can be of the order of 10-15%.

The key phrase is ‘low load’. The vendors of retrofit ‘burner control units’ often claim that the percentage savings achieved in low-load tests will apply throughout the year. This is misleading. For one thing, as the load on the boiler increases to normal operating levels, the scope for savings rapidly diminishes because the number of start-stop cycles will naturally fall; furthermore, the majority of consumption will occur under such conditions. Significant percentage savings are applicable only to a very small proportion of annual consumption.

It cannot be denied that inhibiting excessive firing cycles will save fuel in certain types of boiler with on-off burner controls. The issue is that the claimed savings are commonly exaggerated by unjustifiably extrapolating from low-load tests.

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