



FPS BRIEFING NOTE

A PROBLEM WITH VAPORISING BURNERS?

PROBLEM The problem occurs with an appliance becoming unable to reach full temperature, even with an increased fuel supply, the flame turns yellow and sooty and the burner eventually fails to ignite at all. A much-increased frequency of servicing is required for the appliance and, at these services, severe coking is evident on the burner and its associated pipework, sometimes accompanied by coloured or gummy deposits. These symptoms are evident in both converted and purpose-built oil-fired appliances.

CAUSES Suggested causes for -this problem include:

- Incorrect setting of the appliance controls;
- Water or water/oil emulsion from the storage tank;
- Contamination of kerosene with gas oil, or other long carbon chain material, [as little as one part of gas oil in 1,000 parts of kerosene can affect combustion in these burners];
- Out-of-specification fuel e.g. kerosene with a high 'char value';
- Copper-catalysed degradation, e.g. gum formation, in the fuel;
- Heat cracking of the fuel [extremely high temperatures can occur in and around this type of burner];
- Fuel additives, such as the Euomarker*.

* The EU carried out extensive combustion tests on the yellow dye prior to its acceptance as the European fiscal marker and it is present only in minute quantities. The carrier solvent for the Euomarker concentrate remains unchanged from that used previously when coumarin was the only fiscal marker for kerosene and the excellent solubility of the dye in kerosene precludes the possibility of its precipitation during fuel storage. The yellow deposits, sometimes reported on problem burners, cannot be derived from an organic dye at the temperatures prevailing in these burners.

REMEDIES Remedies that have been tried, *with varying degrees of success*, include:

- Careful readjustment of the appliance controls;
- Dewatering of the fuel and fuel supply system;
- Cleaning or replacing filters;
- Replacing the 'problem' fuel with fuel from a different source, or even from the same source as the original delivery [possibly thereby removing, or dispersing, water or other deposits in the tank];
- Adding 5 – 50% of premium kerosene [C1] directly to the fuel already in the tank [requires careful readjustment of the system controls];
- Replacing C2 entirely by C1 [not acceptable to the appliance manufacturers, this may cause other problems due to altered combustion characteristics];
- The use of commercial additives such as 'Topanol' [actually a long-term storage antioxidant];
- Replacement of copper components in the burner with iron ones or the addition of a copper inhibitor to the fuel;
- Shielding of the fuel inlet piping, e.g. with aluminium foil.

None of these remedies has been proven to have a scientific basis, or to work in all cases, and the char value of kerosene does not provide a sound basis for judgement of the suitability of a fuel for this type of burner [a determined char value of 16 has an identified error potential in the British Standard test method of +/-11, i.e. the true value lies between 5 and 27].

It should be noted that analysis of some uplifted fuels shows that there are cases where water or gas oil contamination is found, caused by poor housekeeping at the premises and/or by the fuel supplier. Wherever possible, distributors should try to identify those customers that have this type of burner and ensure that best practice is followed, particularly where a mixed fuel load is carried on the delivery.

Information for technicians on dealing with problems with vaporising burners can be found at:
<http://www.oftec.org/documents/IndustryBriefingNoteApplianceCombustionIssue0309.pdf>