WOLF STEEL'S TECHNICAL BULLETIN

TB-3

April 1998

SUBJECT: **White Film on glass and inside the combustion chamber**.

This is a development which occurs in many gas appliances but is most commonly observed in the gas fireplace due to the visibility of the combustion chamber. The severity of this condition will vary from location to location and is not exclusive to any one manufacturers's product nor any specific type of gas fireplace. The most commonly affected fireplaces are those of the natural draft design.

In an effort to better understand this phenomenon, Wolf Steel contracted an independent laboratory to analyse a white film sample on a piece of glass from a fireplace insert.. Of the 17 different elements found, the following three represent the greatest concentrations;

Sulphur	67.77%
Calcium	16.42%
Sodium	3.83%

The 14 other elements found accounted for 11.98% of the white film sample and are traced to compounds used in the manufacturing of the fireplace, logs, paint and high temperature sealant. Normally these elements would have been removed had the glass been cleaned after the initial curing process.

The top three elements have two different origins. The first element, sulphur, is found in both Natural gas and Propane. Propane generally contains higher levels of sulphur than Natural Gas but levels will vary from location to location. In either case, the amount of sulphur introduced into the fireplace is not only based upon the sulphur content of the fuel but more importantly, on the amount of fuel the fireplace consumes.

Calcium and Sodium are both water soluble and are found in the air humidity. The amount of these elements contained in the air will vary depending upon environmental conditions. In homes that have higher humidity levels, the potential for this problem is increased. Installations in damp basements or near bodies of water are also more likely to experience this as the damp air is introduced into the combustion chamber. Some areas, where limestone concentrations are greater, will have higher levels of these elements due to the harder water.

In either case, the depositing of these elements predominantly occurs when the fireplace main burner is turned off and the pilot light is left burning. It is at this time that these elements which are in a gaseous state will condense on to the cooler glass and interior surfaces within the firebox. Of course when the main burner is turned on, those surfaces are heated and the overall temperature of the combustion gases is much greater and consequently, condensation doesn't occur.

While the influences of this phenomenon can vary, the result is the same. The white film deposits on the glass and in the combustion chamber can create customer dissatisfaction unless properly addressed. Explaining the cause will help the customer to understand the chemical reactions taking place and the need to clean the glass regularly. For extended periods of non-use, turning off the pilot light will significantly reduce the white film build-up. Of course the humidity level can only be controlled inside the home but even then, reducing that level is not always a viable option.

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For more information, contact our Technical Services department.