

How SOOTBREAKER boiler cleaning powder works

Combustion deposits in boilers are formed in two ways:-

(1) by the incomplete combustion of the carbon, sulphur and their complex compounds in the fuel.

(2) by corrosion of the boiler material by certain products of combustion.

Boiler deposits contain carbon (and high molecular weight compounds rich in carbon) together with quantities of inorganic materials, and products such as metallic sulphates and oxides which may retain corrosive products of combustion.

These latter compounds are themselves comparatively inert, and form a hard tenacious layer on the heat transfer surfaces. The bond formed between the deposit and the metal of the heat exchange surface may be so strong that normal methods of cleaning will often fail to prevent a considerable build-up of this dry-side scale.

Traditional methods of brushing, scraping, and soot blowing, alone are unlikely to remove hard scale and deposit, even where the heat transfer surfaces are accessible. When such surfaces are inaccessible it is virtually impossible to remove the deposits without dismantling the boiler.

To remove such deposits manually, the boiler must be shut down and allowed to cool, with consequent loss of steam or hot water availability.

SOOTBREAKER is designed for use whilst boilers are on-line, eliminating the need for shutdowns. The action of SOOTBREAKER is to generate large quantities of oxidising gases, which pass throughout the boiler and react with the deposit chemically by the action of nascent oxygen and in the presence of a catalyst.

SOOTBREAKER reduces the ignition temperature of the unburned carbon in the deposits to a level at which it will burn away easily, creating a microcellular structure within the deposits, which then become friable and easily removed by gas flow fluctuations.

SOOTBREAKER consists of a sophisticated mixture of alkaline nitrates, propellant materials and catalysts, in the appropriate physical form, and balanced in both quantity and size. The product is free-flowing, to ensure that the components may be readily available in finely divided solid form, and may be picked up by the combustion gas stream and distributed throughout the boiler.

SOOTBREAKER requires a minimum temperature of 350° C in order to function, and therefore works only whilst the boiler is actually firing. At these temperatures SOOTBREAKER sublimates from a free flowing powder to a fine vapour, enabling it to react in both the gaseous and the solid phase.

In order that the chemical reaction can take place in even the most inaccessible parts of the boiler, both the oxygen-bearing material and the catalyst must be propelled there. This is achieved by including ingredients to cause rapid evolution of a gas which

propels the finely divided reactants into the gas stream. The oxygen over-balance of the mixture is carefully controlled with adequate nascent oxygen available to oxidise combustible matter in deposits.

The reaction is highly complex, and many intermediary products and by products are formed. Part of this complex of reactions is one which encourages the formation of "reaction centres" on the solid deposit surfaces. These "centres" initiate reactions on the surface and within the body of the deposit, which, both physically and chemically, tend to break down the deposit, and the bond between it and metallic heat exchange surface.

The result of this is the breakaway of the deposit and the formation of friable pieces and granules of its incombustible parts. These may be readily removed from the boiler by vacuum cleaning or brushing.

The combustion of combustible parts of the deposit normally takes place to completion, producing mainly carbon dioxide, with a little water vapour, and sulphur dioxide, which are carried out of the boiler.

Alkalis present within the SOOTBREAKER tend to neutralise the sulphur dioxide and sulphur trioxide in the presence of water, and leave a desirable alkaline residue as an extremely fine film on heat transfer surfaces.