

## Flame Plasma Treatment

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Widening market areas, high standards and environmental issues have all led to research into gas burner design and flame control, resulting in the development of flame plasma treatment systems. Today, flame treatment offers the plastics, packaging and related industries a refined solution presenting faster and more efficient production as well as significant saving on running costs. Unlike some other applications, Aerogen's flame plasma treatment systems are environmentally friendly, producing no ozone or other hazardous by-products.

The flame simply passes over the surface being treated without dwelling on the product for long enough to damage it. The heat from the flame acts as a catalyst, boosting adhesion as an innate part of the treatment.

Flame plasma surface treatment is a well-developed process which produces and utilizes two key reactions. Firstly, there is the physical reaction, which results from the burner and heating properties of the flame (heat aids any chemical reaction). Secondly, there is the chemical reaction, which produces free radicals generated within the flame plasma - these combine with the substrate to modify its surface without affecting its inherent physical properties.

The surface tension of the substrate is enhanced using the excited ions of the flame plasma to the required levels, usually 48 dynes per cm for painting systems, and 44 dynes per cm for printing or bonding processes.

It is crucial that the air/gas ratio is closely controlled to gain the desired results. Then the ribbon pack burners, with their flame-arresting safety properties, are designed to give an even flow pattern within the plasma across their output range. The mechanical handling mechanisms, combined with combustion controls, provide the necessary residence time and correct positioning of the substrate within the active flame plasma zone gaining process optimization.

It is from this technology that the user can obtain a stable, consistently high level of treatment. Measured to a depth of greater than 1 micron (deeper than other applications) the treatment has good shelf life and provides an ideal surface for painting, printing, adhesive labeling and laminating. The scope for a gas-based system is considerable. Aerogen's systems have been designed for use with individual components, containers or printing webs, and to meet the specific demands of a diverse range of substrates.

