



Flaming Treatment Process

INTRODUCTION

the flaming treatment process meets positive applications in the plastics parts specially in the automotive industry for the treatment of bumpers, dashboards, headlights, spoilers and other plastics parts for painting, printing or coating.

The technology used is reliable, safe and tested by the many industrial applications. The flame treatment penetrates into the surface to increase the adhesion without changing or modifying the physical and optical properties.

The particular type of flame used (1700°C) is the result of combustion of an air/gas mixture.

The nearest zone to the burner screen, is an inner cone characterized by a reducing features, when insufficient air content does not burn all the gas.

This type of flame is non suitable for the treatment process.

Following the inner cone is the outer cone with the oxidizing zone, which contains excess of air in proportion to gas.

This is the right kind of flame capable of achieving treatment and is produced by our burners.

During the flaming process the following parameters have to be controlled:

- the flame temperature;
- the dwell time of the flame passing over the surface, it corresponds to the speed of the burner respect the surface;
- the distance between burner and surface;
- output energy supplied on the surface;
- type of material;
- temperature of the material;
- type of gas;
- room conditions;
- treatment level desired (dyne/cm).

The main parameters are in any case the flame temperature which depends on the air/gas mixture composition, the gap between the flame and the surface, the speed of the burner (flame) respect the surface, the output energy.

The standard test method for checking the treatment level is the ASTM D2578 which is widely accepted and recommended.

In practice a cotton tipped applicator is wetted with one of the mixtures, using only a minimum amount of liquid, as an excess of liquid can affect the test.

The liquid is spread over an area of approx. 1 cm² of the test specimen, treated and not treated.

Noting the time it requires for the liquid formed to break into droplets.

If the continuous film holds for 2 seconds or more the surface is treated.

The flaming treatment is suitable for any surface to be increased the adhesion and it is necessary for the polypropylene and polyethylene.

The main applications are the following:

- painting (bumpers);
- metallization (headlight bodies);
- printing;
- adhesion of glue

Regarding the main benefits coming from the use of the flaming:

- perfect adhesion all over the surface: we can reach up to 72 dyne/cm;
- no decrease of adhesion, even after many weeks after treatment.

The pieces protected can be placed in a storage and then painted;

- no pollution emission;
- negligible operation costs and practically zero maintenance;
- no changes of the optic properties of surface.

APPLICATIONS

The automotive industry is certainly the most important application for the flaming treatment.

The parts treated are bumpers, spoilers, headlights, cover wheels, dashboards and other parts to be painted or printed for aesthetic purposes.

The main industrial applications are by robots and by mechanical reciprocators. In the first case the burner is mounted and moved on the robot arm, programmable, like those used for painting, where the burner replace the sprayer gun.

In the second case the burner is placed in fixed position and the piece is running over a conveyor.

In any case the winning technological solution is represented by the system set up by our Company and improved during the time.

For example with the introduction of the variable flame length, which allows to follow the shape of each piece to be treated; so each point is flamed with same intensity and uniformity.

The length of the flame changes from 5 cm to 15 cm.

Before starting with the flaming treatment an instruction point to point of the surface is done with the robot, in order to make acknowledgement of all points.

The flaming treatment follows the production requirements up to the speed of 60 m/min and over, with a flaming cycle of 30 sec. per two burners.

These results can be reached with a precise and fine control of the air/gas ratio in the mixture, that is the temperature of the flame, and the knowledge of all parameters of the process.

If the flaming treatment is carried out in rooms where solvents are present, a pressurized box is provided in which suitable ventilating systems are present in order to avoid the inlet of solvents.

The severe regulations for the pollution in the environment has introduced water based paints and inks.

This requires that the adhesion on the surface of the material must be very high: water wettability at 72 dyne/cm.

“esseCI” keep the necessary experience, know how and technology to get these results.

Thus the treatment of difficult surface is an argument extremely important for the solution of adhesion problems.

A flaming treatment equipment is composite by a main control unit (air/gas mixture generator) complete of all safety, control systems and of the special combustion analyzer to get the best flame composition.

It can treat two painting lines or two bumpers or two pieces at same time.

The number of flaming stations used is depending by the complexity of surfaces, by the quantity and the speed of the pieces to be treated.

Each station has own safety and control systems and it is provided of suitable burners of adequate length with individual variable flame system.

Special flexible hoses are placed on the robot arm, provided to connect the burner by piping to the mixture generator.

The burner is a special type with flame detector and ignition electrode.

A programmable controller provides the supervision of all operation.

Many interlock safety systems are fitted and they provide the flame shut off and close the gas flow in case of failure: flame off, stop line, stop robot.

Nowdays many treatment systems have been tested (U.V. ray, corona discharge, plasma, hot air, chemical washing, primer) but only the flaming is the most used at industrial level, because:

- it is more reliable and effective;
- it is less expensive;
- it is faster;
- the results can be tested and are repeatable.

The most important automotive industries as General Motors, Honda, Fiat, Ford, Volkswagen, Audi, Opel, Volvo, BMW, Renault have introduced in their painting lines the “esseCI” flaming treatment system.

“esseCI” sells not only machineries of flaming treatment, but above all services and a know how that help our Customers to be a step ahead between different surface treatment systems and to have the best quality of their product.

For this reason “esseCI” has created a 24 h Technical Service operating all days by phone, to respond at your questions, advices and needs.