

INOCON

Micro Cold Plasma

Activation technology



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**INOCON FINDS
AND IMPLEMENTS
SOLUTIONS FOR
CUSTOMERS LOOKING
FOR PLASMA SURFACE
PRE-TREATMENT FOR
THEIR PRODUCTS**

OPTIMUM SURFACE TREATMENT WITH MICRO COLD PLASMA

When materials or surfaces need to be bonded or coated, activation or cleaning is often essential because there is insufficient surface free energy or they are difficult to wet.

That's when INOCON's Micro Cold Plasma (MCP) pre-treatment system comes into play. The atmospheric MCP technology allows sensitive cleaning and activation of surfaces without damaging them. The pre-treatment is especially effective with very non-polar materials – such as plastics – but it also offers surface modification in the form of better wettability with less non-polar materials such as metals.

MCP technology enables inline plasma surface treatment, which means low-cost starting materials, combinations of previously incompatible materials and highly efficient, environmentally friendly manufacturing processes can be used. Thanks to our many years of research and experience in this field, we can draw on a wealth of expertise in order to give every customer the best possible results.



General benefits

- The plasma-treated surface retains its improved properties for several hours (and depending on the material and the parameters, for several days).
- Uniform plasma treatment over the entire treatment area
- A range of different process gases to choose from
- Surface is immediately ready for further processing – no drying of primers (for example) is required.
- Works on plastics as well as on glass and metals
- Eco-friendly process

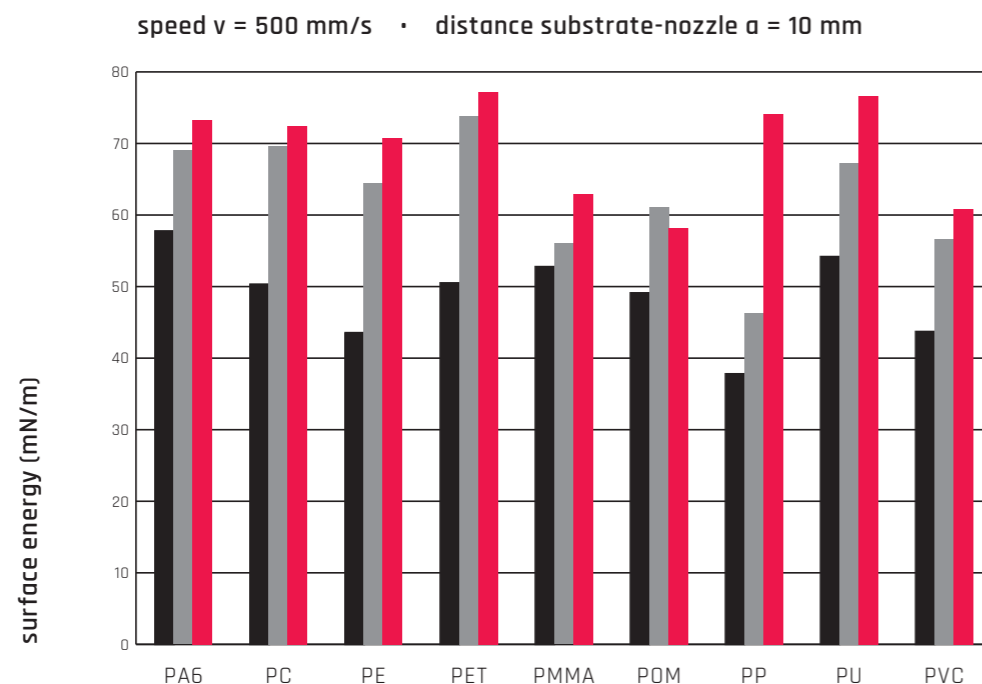
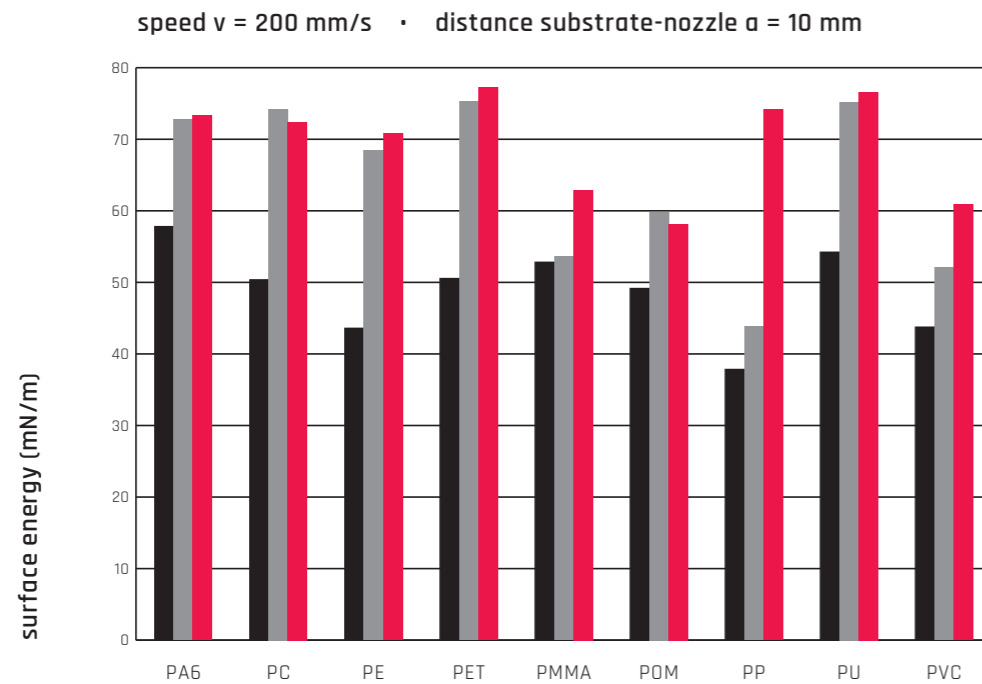


Benefits we offer

- Better accessibility thanks to two different nozzle designs
- A compact power electronics unit and a longer hose package allow the system to be used in tight spaces.
- Low temperatures at the nozzle (max. 250 °C)
- Low consumption of process gases
- Optimised process parameters keep operating costs low
- No reactive power losses in the hose package
- Process speeds of 30 m/min and higher can be achieved, depending on the material and the application
- Long nozzle service life (min. 400 hours)
- Low-maintenance continuous operation



Surface activation with various process gases



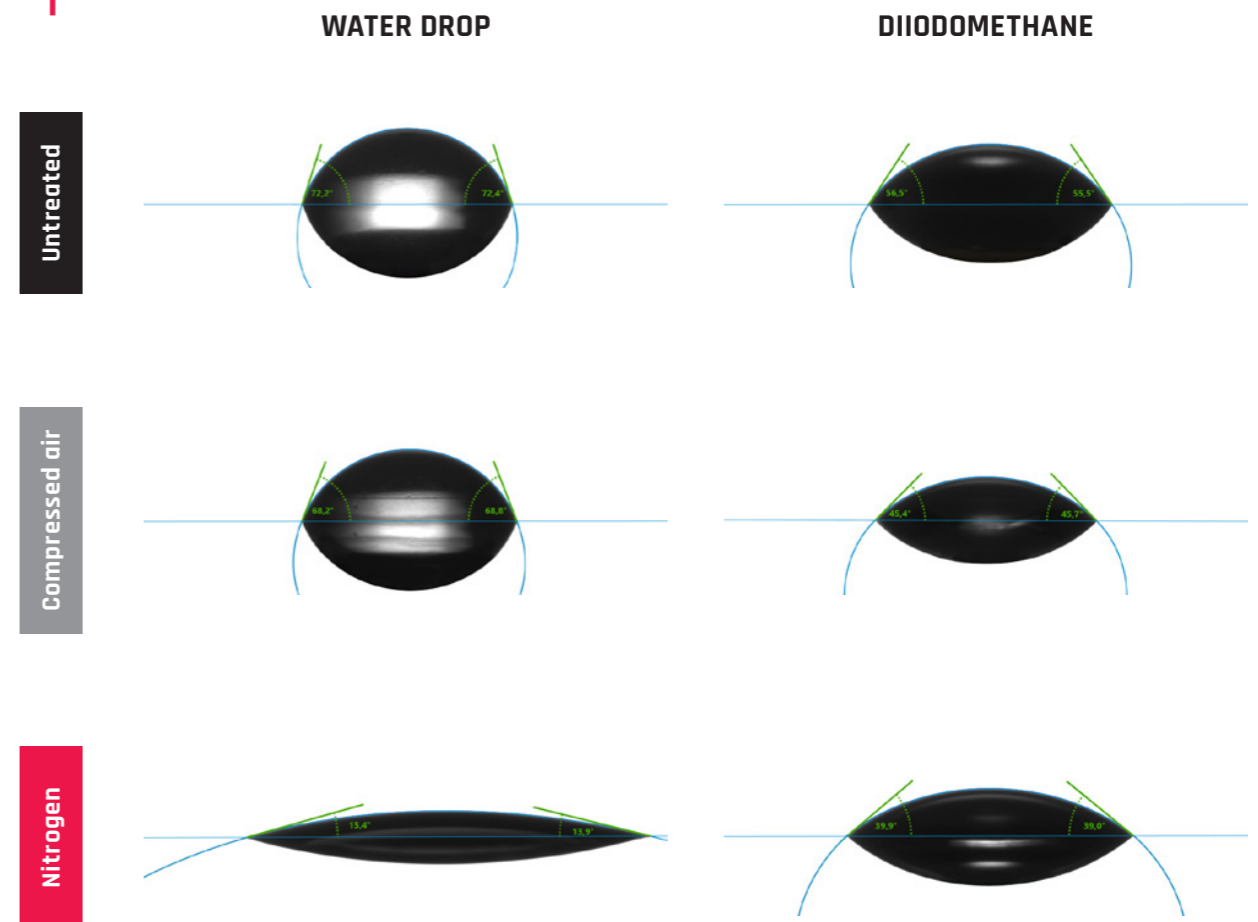
Untreated
Compressed air
Nitrogen



For quality control of the treated surface, test inks with different surface energy values or fully automatic instruments are used to determine the contact angle and subsequently to calculate the surface free energy. The surface free energy in the two diagrams was determined using the Mobile Surface Analyzer (MSA) from Krüss.



As an example, the measured values for polypropylene (PP) are shown in the diagram below.

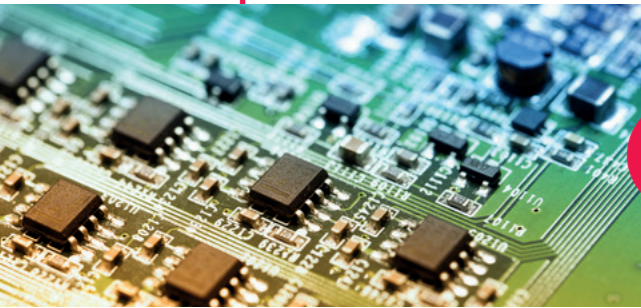


Various process gases can be used to activate or clean surfaces in order to replace non-polar bonds with polar bonds. Examples of this are compressed air and nitrogen, where oxygen or nitrogen bonds - instead of hydrogen bonds - are incorporated.



Applications

Plasma surface treatments have proven to be very useful and efficient, especially in plastics processing. The cost-effective plasma treatment in atmosphere creates the ideal conditions for subsequent printing, bonding or painting processes, as well as for injection moulding or extrusion applications later on.



BONDING PROCESSES

- Bonding of dissimilar materials
- Treatment of almost all plastics
- Sensitive to electronic components



PRINTING PROCESSES

- Uniform plasma treatment over the entire treatment area
- Especially important for glass printing



COATING PROCESSES

- Cleaning the surface
- Improved adhesion properties, helping the coating to last longer



SPRAYING PROCESSES

- Improved adhesion for 2k injection moulded parts
- Inline surface activation before subsequent extrusion process



Activation equipment

The single system (LE501) enables pre-treatment of small substrates or areas. A double system (LE502) is also available for applications with larger areas or where treatment on both sides is required. The LE2000 further increases the electrical output, opening up new possibilities for surface pre-treatment.



LE 501



LE 502



LE 2000

Dimensions (L x W x D)	315 x 150 x 245 mm	330 x 150 x 255 mm	345 x 150 x 275 mm
Power electronics unit weight	approx. 5,5 kg	approx. 6,0 kg	approx. 8,7 kg
Output per plasma head	1 x 500 W	2 x 500 W	1 x 2000 W
Hose package length	10 m	10 m	10 m

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