



Ferrarini&Benelli
Corona and Plasma

**50 YEARS
PRESENT WORLDWIDE
WITH CORONA TREATMENT
AND NOW WITH PLASMA**



Ferrarini & Benelli design and manufacture stations for Corona surface treatment and Plasma 3D treatment. The company's HQ is in Romanengo in the Italian province of Cremona.

Corona and plasma treatment

We work closely with the major international manufacturers (OEM) of extrusion and flexible packaging processing equipment.

Product design, together with soft and hardware for our generators are all **handled in-house** by our own qualified personnel.

This knowledge and expertise, coupled with **manufacturing flexibility** allow us to develop customised solutions together with the customer.

We have produced more than 10,000 **corona stations** that are used daily **worldwide** to improve the wettability properties of various surfaces. The corona treatment stations are used mainly in the **extrusion** sector and in **converting** and allow treating: conductive and non-conductive materials, plastic and metallised film, paper and aluminium foil, even laminated, solid and hollow sheets and polyethylene pipes. We produce several types of stations: double-sided, single-sided, mobile unit to treat a small strip of a film, narrow web for labels or adhesive tape.

Taking advantage of the knowledge of surface treatment we have gained away from the world of packaging, we introduced **plasma treatment** in 2010 for the automotive sector, medical, pipes and other applications.

Services

- A well-structured sales network with commercial agents directly supports Ferrarini & Benelli's end users worldwide
 - Specialised and expert staff provides assistance and training around the world
 - Our in-house laboratory simulates customers' operating conditions for testing treatment on their materials
 - Customised studies for special mechanical applications
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In 2015, we achieved an important milestone: 50 years in the business.

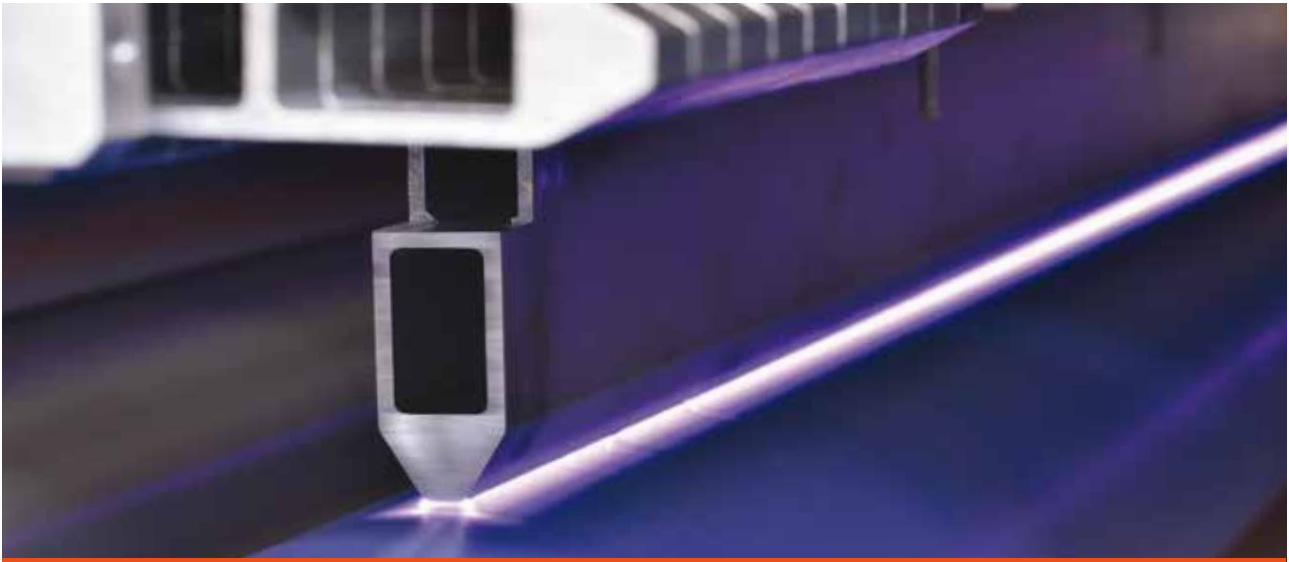


CORONA

BIKAPPA ROTARY

High performance double-sided treatment for **blown film** lines on their own, or with in line flexographic presses.

- **BIKAPPA ROTARY 120** for all blown film applications; widths up to 2800 mm
- **BIKAPPA ROTARY 150** with big diameter rollers for wide web widths moving under tension
- **BIKAPPA ROTARY 200** for large widths from 3000 mm up to 4000 mm (production of heat-shrink films or agricultural films)
- **BIKAPPA ROTARY PRINTING STEP** for extrusion lines with inline flexo print, allowing for intermittent treatment in register with two-sided print
- **BIKAPPA POLIMETAL** with ceramic electrodes for the treatment of conductive materials in printing and laminating processes
- **MINI BIKAPPA** double-sided treatment station for mini extruders or **laboratory extruders**



BIKAPPA TUNNEL

Single-sided treatment station designed to be mounted on blown film extruders for the treatment of the **inside of the bubble** (two single sided treaters are placed after slitting, where the blown film is opened and separated into two). The compact design and small size allow easy installation in the tunnel of the extrusion line before the winding unit.

TM STRIPE

Mobile unit for the treatment of a small strip of a wide width film. Optimal for treating small areas where a brand logo is to be printed.

CARTONPLAST

Single-sided or double-sided treatment station for rigid solid or hollow sheets. Good treatment levels are possible even with sheet thicknesses of 10 mm for solid and 15 mm for hollow sheets. Automatic adjustment of the air-gap which adapts to the **thickness of the sheet** while the machine is in motion.

CORONA

POLIMETAL

Suitable for single and double-sided treatment of both **conductive and non-conductive materials**: plastic and metallised film, paper and aluminium foil and also laminates. With ceramic electrodes and rollers, it is used on flexographic and rotogravure printing, laminating and coating machines and on every type of converting equipment. The models differ in the number of electrodes, diameter of the ceramic rollers and speed of production lines (up to 600 m/min).



POLIPLAST

Single and double-sided treatment of **plastic film and paper**, with adjustment of the electrodes with change in the width of the film or in a single bar. For applications on extrusion coating, converting and cast film lines. The various models differ in the number of electrodes, diameter of the rollers and speed (up to 600 m/min).

ET 98

ET 98, designed for label printing lines, is equipped with a cartridge system for removal of the electrodes and ceramic rollers.

This model treats both **conductive and non-conductive materials**.



ET LABO

Manual treatment of **samples of material** (in A4 or A3 size) designed for the in-house laboratories of ink and adhesives manufacturers. ET LABO allows you to treat material samples to the desired level to perform tests on the adhesion of ink, glue, adhesive or other substrates.

SPECIAL PRODUCTS

OZO-NO!

Our **Ozone Destruction System** enables companies using corona treatment stations to remain within the limits of ozone imposed by law. The catalyst regeneration service allows for significant cost savings.

TTU

Internal and external treatment of polyethylene pipes (district heating systems) patented by Ferrarini & Benelli to improve the anchoring of insulating foams inside the pipes, and the bonding of marking inks on the outside.

- TTU - 500 for pipes with diameters from 90 mm to 500 mm and a maximum thickness of 8 mm
- TTU - 1000 for pipes with diameters from 400 mm to 1000 mm and a maximum thickness of 15 mm



FORMAT

Single-sided treatment station for small and large sized single sheets. It can treat plastic materials, paper, plasticised paper and even metallic or conductive materials in general. Useful for restoring the suitability for printing of materials that have been stored for a long time. The sheets can be inserted manually or automatically.

DYNE TEST: INKS, PENS AND MARKERS

Dyne Test Inks are liquid measures for assessing the level of adherence of a liquid on a plastic surface. Used mainly in the laboratory, they allow accurate measuring of the effects of corona treatment. Values of reference: 30 - 58 dynes/cm.

Dyne Test Pen is non-toxic and is used to quickly assess whether a material has been treated or not. Reference value 38 dyne/cm.

Corona Marker highlights the treated areas (the ink is laid permanently).



PLASMA

FB Plasma 3D works under atmospheric pressure conditions, ensuring optimal levels of wettability of **polymers, plastic parts, cardboard and metals**.

Composed of a high-frequency generator and a dedicated nozzle, it can be integrated in new or existing lines and promotes the application of inks, paints, adhesives and coatings, eliminating release agents and additives, conferring greater resistance to corrosive agents. Unlike corona treatment, **it produces no ozone**.

The treatment area is about **10 mm** wide.



Benefits

- It improves the **properties of the materials** (hardness, scratch resistance and corrosion resistance, water/oil repellent)
- It promotes the **anchoring of seals** and the bonding of parts of motorcycles, trucks and domestic appliances
- It improves the **bonding of inks** in the printing process

Applications

- Pad printing, Silk-screening, Ink-jet **printing**
- **Laminating** applications: improvement of the durability and reliability of gaskets; application of glue on folding cartons; flocking on rubber and plastic
- **Cleaning** applications: removal of dust and grease from plastic
- **Degreasing** of steel, metal and semi-finished products

CORONA 3D

The innovative Corona 3D treatment is a great alternative to plasma. Ideal for non-conductive materials, the treatment width of a single torch is **40 mm**. The system is also available **with two torches**.



GENERATORS

Our digital generators are **combined with the corona and plasma systems**. The three-phase corona treatment generators, with integrated digital control system, can attain the high power needed to treat the most difficult plastic materials at maximum line speed.

The generator software independently manages the power circuit to adjust it automatically according to the line speed. A wide range of power levels is available with remote systems for control of the corona treatment in the control panel, PLC or PC of the line where the treatment is installed.

Main digital and automatic functions

- **Automatic** turning on and off of the discharge according to the speed desired by the user
- **Power adjustment** as a function of line speed and different materials used
- **Automatic power control** function to keep the corona discharge constant regardless of the voltage variations in the power supply
- Automatic calculation of the **power density** employed ($\text{W/m}^2/\text{min}$)



Corona Quality Control

Software for the **monitoring and certification of corona treatment**.

The measure that best represents the **degree of treatment achieved** is "watt density" (WD) that depends on the power supplied by the generator, the line speed and the length of the discharge electrodes. Processing data are first recorded on SD memory card to be installed in each corona generator and then copied to a PC.

The innovative Corona Quality Control software created by Ferrarini & Benelli enables:

- **creation of graphics reporting the progress of fundamental production measures**
- **filing of reels produced by adding processing data**
- **identification of reel sections in which the power supplied deviates from the set power**

A single application to check all treatments, lines and reels!

APPLICATIONS

- **Blown film extrusion:** single-sided or double-sided treatment for LDPE, LLDPE, HDPE and multi-layers
- **Cast extrusion:** high-speed single-sided and double-sided treatment for OPP, CPP, BOPP, PE
- **Sheet extrusion:** single-sided and double-sided treatment of rigid and hollow sheets of significant thickness
- **Foil extrusion:** single-sided and double-sided treatment of semi-rigid foil or foam
- **Pipe extrusion:** patented system for the internal treatment of pipes for district heating and improvement of the bonding of polyurethane foam
- **Laminating and Coating:** to improve the bonding of adhesives with or without solvent, and with water-based systems
- **Flexographic and Rotogravure Printing:** to improve the bonding of ink with solvent, without solvent and with water-based, UV and EB systems
- **Extrusion coating:** to improve the bonding of PE coating on substrates such as paper and aluminium
- **Narrow web:** narrow web treatment systems, used for printing labels and adhesive tapes
- **Production of cables, tubes, sections:** to improve the adherence of inkjet printing or adhesives



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