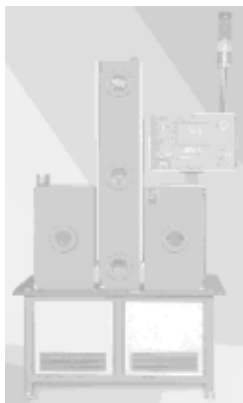


Plasma Science Systems For Surface Cleaning and Modification



Aluminum box chamber
high throughput production



Microprocessor touch screen controller
easy and precise operation

Patented electrode design
maximum process uniformity

Primary plasma operation
most effective plasma exposure to all parts

MFC gas input/mixing
precise, reproducible gas mixing and distribution



RF auto matching network
reliable and efficient gas plasma generation

Turnkey vacuum system
readily integrated for the most efficient operation



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Plasma System Portfolio

PS-2020



General Application:

Continuous roll-to-roll processing for cleaning flexible circuit with interleaf material.

System Features:

- Handles rolls up to 6 inches in width and 10 inches in diameters with web speeds of 1-30 feet per minute. (Extension available for 12 inches materials.)
- Unique mechanism removes Interleaf layers in the process and reapplies on completion for easy handling.
- Plasma Science patented chamber electron design for process consistency and uniformity.
- PLC touch screen control storing up to 14 pre-programmed process recipes.
- PC control available for data logging and remote operation.

Process benefits:

These flex circuits are treated to remove carbon contamination from laser drilling processes and other forms of organic which may inhibit bonding of micro-circuits. Processing of the flex circuit on the reel greatly reduces handling and process time of the end products.

Plasma System Portfolio

PS-3030



General application:

Surface treatment of all forms of roll materials.

Specific application for the unit:

Plasma surface treatment for non-woven fabric in roll form, up to 1 meter in width for the production of high performance battery separators.

System features:

- Continuous control of roll speed and tension using the latest servo technology.
- Special load/unload mechanism maximizing throughput.
- Plasma Science patented chamber electron design for process consistency and uniformity.
- Multiple pumping packages for maximum efficiency and minimal pump-down times.
- Remote access control incorporating data logging unlimited recipe storage.
- On-line information accessible via modem or Internet connection.

Process benefits:

Plasma treatment increases liquid absorption of non-woven fabric materials used in the manufacturing of battery separator. Using continuous plasma system such as PS-3030 in combination with AST Products patented hydrophilic coating technology. The hydrophobic fabric is effectively turned into high value battery separators for use in a variety of advanced battery applications.

*US Patent No. 4,887,005 / 5,190,703 / 5,228,963 / 5,733,511
5,700,559 / 5,807,636 / 5,837,377*



Plasma System Portfolio

PS-Tumbler



General application:

Plasma processing of parts in irregular geometric shapes.

Specific application for the unit:

Plasma surface modification for golf balls to enhance bonding property prior to coating process.

System features:

- In-line batch processing with unique load/unload mechanical integration to current manufacturing process.
- Process capacity in excess of 7000 balls per hour.
- Plasma Science patented chamber electron design for process consistency and uniformity.
- PLC touch screen control storing up to 14 pre-programmed process recipes.
- PC control available for data logging and remote operation.

Process benefits:

Plasma treatment of golf balls prior to final coating greatly enhances the bonding adhesion between the outer lay of the ball and the coating. The low temperature gas plasma does not deteriorate the materials of the golf ball or damage the dimples precisely designed for ball flight distance and stability.

AST/Plasma Science patented chamber electrode design ensures process uniformity and consistency even in the high speed, tumbler process in excess of 7000 balls per hour.