

Plasma Technology

FTMC Tender No P81, PPP 1.004, FD2

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Specification No. 22102708

PlasmaPro 80 RIE

*Parallel Plate - Reactor
Reactive Ion Etching (RIE)*

- 13.56 MHz supply with automatic matching
- 300 l/s Turbomolecular pump with dual stage rotary pump incl. oil- and exhaust filter
- automatic pressure control
- PC Control with OPT software under Windows 10
- Mass Flow controlled gas lines
- Visit of a process engineer from the OPT application lab
(30 process engineers, 20 technology engineers) for process start up and training
- Free of charge process support for the system lifetime

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Supplier Information and Design Goals

Process: The OPT application lab supports our users throughout the lifetime of the system with advise and with new processes if needed. Typically our systems are capable running a variety of processes without the need of hardware changes. New processes are permanently under development/ characterisation, so that they can be run on our existing equipment.

Quality: OPT is qualified according **ISO 9001 (today ISP 18002)** since 1995. In 1993 a TQM programs was started and a the position of a dedicated quality manager was created.

Safety: The equipment meets the European requirements like **CE mark**. The soft- and hardware is designed to ensure a safe system operation even with untrained personal.

Software: All the OPT systems have programmable logic controllers to ensure a safe operation. The user interface is a standard PC. OPT writes the software in house in close contact with our process engineers to ensure maximum flexibility. The software operates under Windows to allow easy communication with other software (for evaluation the datalog files or network integration etc) and to give the users a familiar environment.

Footprint/ Service Access:

The OPT equipment has been designed to give minimum footprint and excellent service access (see our extensive installation documentation).

Modularity and Flexibility:

Our systems are designed for easy retrofit of components like a vacuum loadlock, a variety of plasma sources (ICP65, ICP180, ICP380) or end point detectors (OE, LI, SIMS) in terms of hard- and software. The **Plasmalab 80/ 800 Plus** series single modules can be retrofitted with "slave" chambers, while the **Plasmalab System 100**, the **FlexAL**, the **Nanofab**, the **Ionfab 300 Plus** and the **Plasmalab System 400** series only include MESC compatible modules and together form our CLUSTER series, the "**System 100 Pro**".

Installed base: OPT supports more than 3.500 systems installed world-wide and builds > 150 new systems per year.

OPT builds standard equipment with a variety of common components and software allowing us to carefully select and check the components. Before shipment our systems are thoroughly tested. Even the most reliable system, however, will fail some time. At OPT we consider this already in the design phase for our equipment:

Components: Only components of suppliers with excellent reputation and own world-wide service network have been chosen, so that many components can be repaired locally.

Manual: Our manuals include the complete system documentation incl. subsuppliers manuals.

Spares: Common spares are shipped typically on day of order direct from our headquarter in UK.

Service: OPT has a world-wide service network to support its systems by telephone advise and service engineers visiting our customers. In Europe we have 12 service engineers.

CONTENT

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(1.) PROCESS CHAMBER

Aluminium Process Chamber with:

- 150 mm pumping flange for very high effective pumping speed.
- front 40 mm flange with viewport.
- Additional 40 mm flange, with window for optical emission.

The chamber is made from a full block of Al.

Chamber and pumping: 100 % radial symmetric.

There are no further sealings or weldings inside the process chamber for achieving very good vacuum conditions.

The process chamber can be retrofitted with:

- Inductive Coupled Plasma (ICP) - Source: ICP65

(2.) SYSTEM CONSOLE

The control components are integrated in the frame and protected against water leaks.

The console is purgable and contains the turbopump and the valves.

The PLC controller is mounted in the system frame.

All panels are easy to open.

(3.) SUBSTRATE - AND TOP ELECTRODE

Substrate-Electrode

Water cooled aluminium electrode, RF driven.

No water to vacuum seals.

RF power (13.56 MHz) as well as a heater/ chiller for temperature control can be connected to the RIE electrode.

Aluminium dark space shield (on ground potential).

Electrode diameter: 240 mm.

Graphite plate.

Quartz plate.

Recesses for specific substrate sizes on request.

Chiller for the RIE substrate electrode (-10° - +30°C).

Top Electrode

Aluminium top electrode with integrated shower head gas inlet.

The top electrode moves (pneumatically) upwards and backwards simultaneously for very good access to the process chamber.

25 mm flange in the top electrode for (retro)fitting a laser interferometer.

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(4.) COMPUTER CONTROL

The system is controlled by a very fast Programmable Language Controller (PLC) with digital and analogue I/O.

high speed distributed I/O that sends and receives I/O data in less than 400 μ s.

Fast data logging frequency with interval ≤ 250 ms.

Definition of short process steps down to ≤ 10 ms.

The OPT control software runs under Windows 10.

- flexible, menu-driven software, mouse.
- 22" LCD monitor.
- datalogging: The parameters to be logged can be selected from a complete list of analog/digital in- and output parameters. This selection can be stored separately from the process. The selected data will then be stored with a selectable time interval.
- DVD/CDRW drive.
- LAN card.
- indication of the actual and requested parameters.
- process control with selectable limits for the parameters.
- manual control page.
- service mode.
- automatic leak check and MFC calibration function.
- automatic CM gauge autozeroing function.
- 5 password levels: System Manager, User, Maintenance, Production, View only.

(5.) PLASMA GENERATION

Substrate electrode:

- 13.56 MHz generator with automatic RF tuning.
- The AMU is directly coupled to the substrate electrode (no cables).
- Patented wide range AMU ($< 2\%$ reflected power).
- maximum power: 600 Watt.
- RF-Bias ('Self Bias') indication.
- Power/ Bias control.
- The start positions of the automatch capacitors can be independently chosen for each process step.

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(6.) VACUUM MEASUREMENT

250 mtorr CM gauge, temperature compensated Penning gauge.

(7.) GAS SUPPLY

Sealable and extractable stainless steel gas pod for max. 8 gas lines.

Included are four MFC controlled gas lines, none with a bypass line and metal sealings.

CHF₃, Ar, CF₄, O₂.

Gas lines electropolished, orbital welded.

Each line is equipped with the MFC, a particle filter and one electropneumatic valve, bypassed gas lines have three valves.

MFC type: MKS (others on request).

Only VCR fittings are used in the gas pod.

(8.) PUMPING SYSTEM

300 l/s turbomolecular pump (Pfeiffer HiPace 300), chemical series.

Dual stage rotary pump with oil filter and exhaust filter incl. oil return (Fomblin) Alcatel 33 m³/hr, Pfeiffer DUO.

Throttle valve for automatic pressure control, VAT.

High Vacuum Gate Valve, VAT.

Automatic bypass line.

Ultra Soft Pumping.

Pumping from atmosphere by a 1/4" SS gas line.

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(9.) ADDITIONAL SUPPORT

Process guarantee.

Free of charge process support over the system lifetime

(by the OPT application lab: 35 years experience, 20 systems, 30 process engineers (mostly PhDs)).

- preacceptance in our Yatton (UK) factory, not including any travelling expenses.
- commissioning/ final acceptance and training.
- hardware training.
- process training (during the preacceptance in the factory).
- process support during and after the warranty period (on request).
- one system manual (on DVD, English).

(10.) DELIVERY

Delivery: CIP (incl packing, freight and freight insurance).

Delivery time: 22 weeks.

Warranty: 12 months after final acceptance.

OXFORD INSTRUMENTS GmbH
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