1 Introduction

This Chapter describes the PEP Iridia DL documentation set, and describes the contents of the chapters in this guide. It also provides a brief explanation of ashing in the PEP Iridia DL.

Who Should Use This Guide

This guide is intended to assist service personnel who are responsible for maintaining the PEP Iridia DL. Before performing maintenance on these systems, read this manual.

How to Use this Guide

- Chapter 1–Read this chapter for a brief introduction to the basics of the PEP Iridia DL. It also lists the associated manuals.
- Chapter 2–Use this chapter to learn about the safety features in the PEP Iridia DL and to learn about possible hazards associated with semiconductor-production equipment.
- Chapter 3–Read this chapter for a brief theoretical description of certain parts of the PEP Iridia DL.
- Chapter 4–Use the preventive maintenance information in this chapter to promote tool efficiency.
- Chapter 5–Use the procedures in this chapter to test and calibrate certain parts of the PEP Iridia DL.
- Chapter 6–Use this chapter to more efficiently remove/replace certain parts in the PEP Iridia DL.
- Chapter 7–Use the troubleshooting information in this chapter to help identify possible equipment problems.
- Chapter 8–Use this chapter as an aid in troubleshooting the RF system.
- Appendix A–Use this appendix to find the appropriate phone numbers that you can use to call GaSonics International.

Documentation Set

Table 1-1 list the various manuals that accompany the PEP Iridia DL.

Table 1-1 List of Publications

Publications Media	FPIG*	Operations Guide	Service Guide	Drawings & Schematics
PEP Iridia DL Clean Room Publications	98-3368	98-3360	98-3366	98-3367
PEP Iridia DL Standard Paper Publications	98-3361	98-3267	98-3362	98-3363
PEP Iridia DL Publications on CD	98-3334		98-3335	

*FPIG (Facility Planning and Installation Guide)

Introduction to the PEP Iridia DL

Figure 1-1 shows a pictorial view of the inside of the PEP Iridia DL. The PEP Iridia DL can be used to independently deskin wafers (remove a crusted layer of photoresist without penetrating a lower layer of conventional photoresist) or can be used to independently remove photoresist. In addition, the PEP Iridia DL can be used in a two step process: deskin a wafer and in a "second step" perform a conventional ash removal. Also, the PEP Iridia DL can operate while simultaneously producing microwave energy and rf energy.

Deskin (Crust Removal) Operation

The deskin process in the PEP Iridia DL starts when a wafer is placed on the platen and the pins are lowered. The platen is heated, heating the wafer and crusted photoresist by an external heater/chiller system. The chamber door closes and the chamber is pumped down to 400 mTorr. Oxygen and nitrogen are metered (400 sccm) into the gas lines by the MFCs and flows through the plasma chamber, scope chamber, and lamp tray into the process chamber. Rf energy is present in the chamber which ionizes the oxygen molecules and produces monotomic oxygen as well as ionized gases.

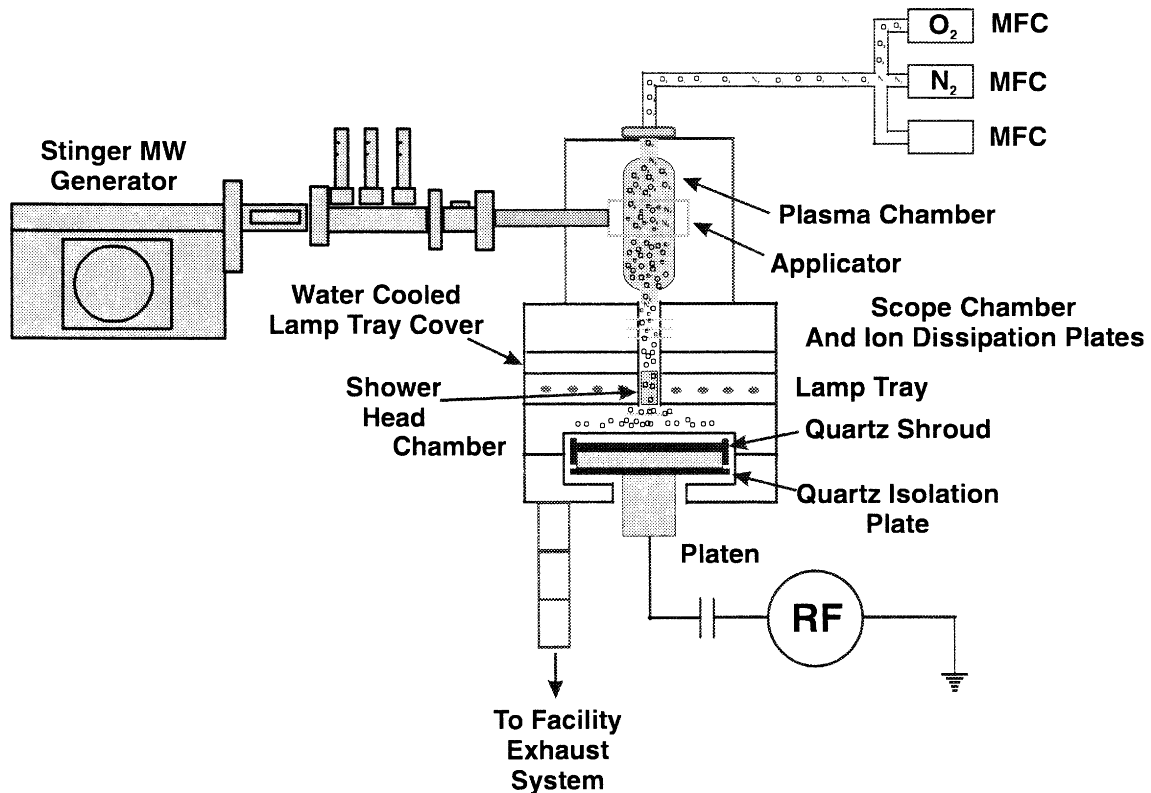

Figure 1-1 The PEP Iridia DL Energy and Chamber System

When the wafer is "deskinned," step one concludes, based on time. Step 2 (bulk ashing) begins. The lift pins raise the wafer. The lamps in the lamp tray are turned on raising the temperature of the wafer and photoresist. The temperature is controlled by the CLTC (Closed Loop Temperature Controller). The system is pumped down to 950mTorr, causing the gases to flow through the system. Oxygen and Nitrogen are metered into the gas lines by the MFCs. The microwave generator is applied, creating a high-energy field in and around the applicator which excites and energizes the gases in the plasma chamber. This produces monatomic oxygen (O) and other positively and negatively charged ions (plasma).

The plasma is restricted as it flows through the neck of the plasma chamber into the scope assembly. The scope assembly contains plates (sapphire or quartz) and spacers that further restrict and dissipate ionized gases, causing them to recombine (lose energy). This protects the underlying layer of the wafer. The monatomic oxygen molecules are drawn through the shower head, dispersing them evenly over the surface of the wafer which are the active species that remove the photoresist.

When the photoresist is removed, the EOP (End of Process) signals the end of the process: oxygen and nitrogen flow terminates, microwave energy terminates, the lamps in the lamp tray are turned off, nitrogen is metered into the system to purge it to atmosphere, the gate

valve closes, the chamber comes up to atmosphere, and the chamber door opens. The robot removes the wafer and the system is ready for another process.

EOP

The *end of process* is detected in the PEP Iridia DL by a change in the EOPs detector voltage which occurs when the photoresist is removed from the wafer. The change in voltage signals the end of the process. This shuts off the gases, shuts off the microwave, and closes the gate valve. When the chamber returns to atmospheric pressure, the chamber door opens. The robot places the wafer on a cooling station and places the next wafer in the chamber and the process repeats.

Physical Description

The system is modular in construction, and ships as three basic modules [handler module, and two Process-Control Modules (PCMs)] plus wall boxes (main and an optional auxiliary wall box).

- The handler module contains the Graphical User Interface (GUI), the main computer that controls the computers in the PCMs, the cassette platforms, and the robot for picking and placing wafers in and out of the chambers and cooling stations.
- The PCMs contain a gas box, a process chamber, a PCM computer, and various controllers for processing and stripping photoresist from wafers.
- Main wall box powers the following:
    - EMO circuitry
    - Lamp power
    - System power
    - Microwave and RF Power
- Auxiliary wall box powers the following:
    - Pump (Optional)
    - Chiller (Optional)

The systems are suitable for through the wall mounting in a clean room as a flush mount and can also be installed as a free-standing unit. You may mount the wall box(s) on a wall or on an optional wall-box frame.

An Uninterruptible Power Supply (UPS) is required with the system. An optional UPS is available from GaSonics, as is an optional transformer for power step-down or delta to WYE conversion. Please consult you facility electrical staff regarding your requirements.