

Reactive

Gas

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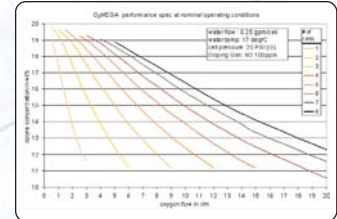
Ozone Generators and Subsystems



O₃MEGA® Integrated Ozone Delivery System



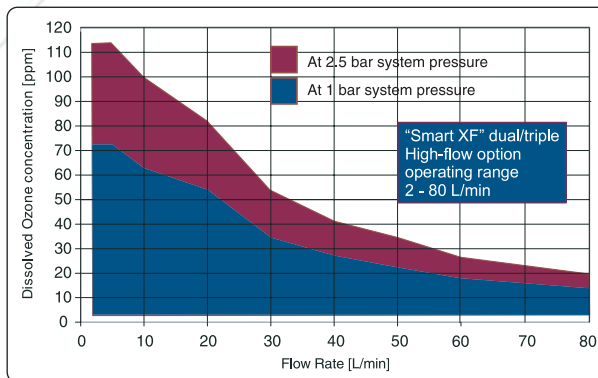
The O₃MEGA® is a fully automated, integrated ozone delivery subsystem designed for advanced semiconductor applications; uniquely configurable to optimize performance with cost. With the O₃MEGA, ozone delivery subsystems have been redefined, providing a more compact, complete and integrated solution than ever before. The O₃MEGA subsystems incorporate MKS' field proven, high concentration, ultra-clean ozone generation technology, an integrated ozone concentration monitor, flow control for both O₂ and dopant gas species, as well as an electronic pressure controller. Designed for maximum configuration flexibility, O₃MEGA subsystems match ozone value to your process requirements in the smallest, most complete delivery system available.



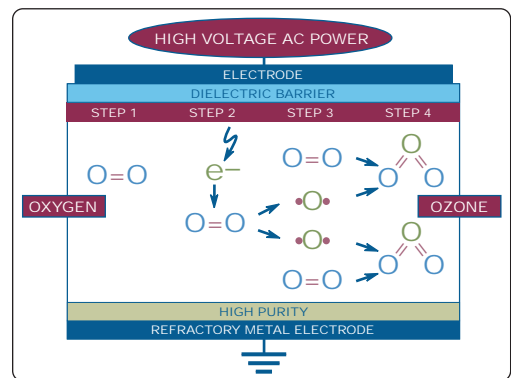
Ozone Products

MKS offers a complete spectrum of ultra clean, highly reliable ozone generation, delivery and accessory products. The ozone product family includes compact, powerful ozone gas generators, high concentration, closed-loop controlled ozone gas delivery subsystems, state-of-the-art, high concentration dissolved ozone liquid delivery subsystems and ozone accessories for flow, mixing and ozone destruction.

Working in our fully equipped ozone laboratory, as well as with leading industry research facilities, MKS supports expanded applications for ozone through a staff of scientists, expert in the use of ozone. Our applications expertise is augmented by our experienced system design engineers who understand the needs of semiconductor manufacturing. The result is the most comprehensive, reliable, clean and powerful ozone product offering in the industry.



Ozone performance range



Ozone generation by silent discharge

MKS Ozone Generators produce ozone from oxygen through the silent discharge principle. High purity oxygen is exposed to an electrical discharge. The discharge excites the oxygen molecules, breaking them into their atomic state. The atoms recombine into a mixture of ozone (O₃) and oxygen (O₂).

Ozone is increasingly used in a number of semiconductor manufacturing steps including CVD and many wet wafer processing applications. Ozone is an environmentally friendly alternative to many process chemicals. It has a high redox potential, can be generated at the point-of-use and is easily converted back to oxygen, reducing the cost to purchase, store and dispose of many chemicals.

APPLICATIONS

- TEOS/O₃ CVD
- Ta₂O₅ CVD
- ALD
- Surface Conditioning
- Oxide Growth
- Wet Wafer Cleaning
- PR Strip
- Contamination Removal



LIQUOZON® Single
Ozonated Liquid Delivery System

accurate ozone concentrations. The LIQUOZON Single was specifically designed to supply DIO₃ water to single-wafer cleaning tools. The LIQUOZON Single delivers high and accurate ozone concentrations between 5 and 95 ppm at flow rates between 0.5 and 20 L/min and at a pressure of up to 2.5 bar (gauge) (36 psi=0.25 MPa).

With the newest design, the LIQUOZON LoopO₃, the possibility of a recirculation loop at elevated pressure of up to 3.7 bar gauge is added at flow rates of up to 10 l/min. Optionally, a booster pump at the UPW inlet can be integrated and lowers the necessary inlet pressure.

SEMOZON® Ozone Generators & Delivery Subsystems

The SEMOZON® product family offers solutions providing the highest modularity, flexibility, and reliability in ozone generation and delivery with a compact footprint.

The AX8400 series generators are extremely reliable and maintenance-free featuring high purity oxygen feed gas, ppm levels of dopant gas and an all welded construction.

The SEMOZON AX8550 Delivery System is a modular design using one or two AX8400 series generators with a choice of common or independent, dual-channel gas flow control, and a closed-loop concentration monitoring and control system. This design contributes to maximum uptime for high flow, high concentration, ultra-clean ozone generation and delivery for high rate processes.

The MKS AX8555 Ozone Delivery Subsystem is configurable with up to four independent channels to support multiple ALD tools providing ultra-clean, high concentration ozone gas concurrently. The ozone source for each channel is the production-proven AX8560 ozone delivery subsystem.

Uniquely suited for use in semiconductor fabrication, the SEMOZON product family meets the needs for high concentration, ultra-clean ozone generation.

SEMOZON® AX8500 Delivery System
and AX8407 Ozone Generator



LIQUOZON® Ozonated Water Delivery Subsystems

MKS offers several ozonated liquid delivery subsystems;

- LIQUOZON® Single
- LIQUOZON LoopO₃
- LIQUOZON Smart
- LIQUOZON 100
- LIQUOZON XF

All systems are compact, self-contained units that supply ultra-pure ozonated water (DIO₃) in high and

The LIQUOZON Smart (pictured on front cover) provides exceptionally high, accurate and stable ozone concentrations utilizing constant pressure. The basic LIQUOZON Smart configuration is for flows up to 25 liters per minute. Also available is the high flow option which can handle flow up to 80 l/min per minute (for multiple outlets, flow rates up to 80 liters per minute). Maximum dissolved ozone concentration is 114 ppm.

Both the 100 and XF LIQUOZON systems are designed to deliver ozonated water with a full range of dissolved ozone concentrations from 5 to 90 ppm, the highest concentration available on the market. Closed-loop control ensures delivery of ozonated water at a stable concentration, even at variable flow rates.

With wide flow ranges, ultra clean water delivery, and high quality ozone resistant materials, MKS' family of LIQUOZON systems help to accommodate a broad spectrum of process requirements. Typical applications include photoresist removal, wet wafer cleaning, FPD substrate cleaning, oxide growth, and surface conditioning.



Ozone Gas Destruct (OVS)

Ozone Accessory Products

As a complete ozone source, MKS offers not only ozone expertise, but also solutions to make using ozone easier.

Ozone is a highly toxic gas. Wherever ozone is used, safety measures have to be taken in order to protect personnel and equipment from unintended ozone exposure. One such important safety measure is the destruction of excess ozone gas that is not used in a process. The OVS ozone gas destruct unit is designed to safely convert high levels of ozone into oxygen, reducing the ozone level down to detection limit, well below safety thresholds.



AX8555 Ozone Delivery Subsystem showing O₃MEGA Generator with advanced control features.



MKS Reactive Gas Generators & Subsystems

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