# Tegal 903e TTW (Through The Wall), 6” inches system configuration:

Wafer Sizes (Customized)
Handles 3”(75mm), 4”(100mm), 5”(125mm), 6”(150mm) Silicon.

**General Description**

The Tegal® 901e and Tegal® 903e were made by Tegal Corporation and represents the Industry Standard in single-wafer Dry Etch of Polysilicon, Nitride, Silicon Oxide and the mainstay of the highly successful plasma etch system.

The Tegal® 90Xe Plasma/RIE etch Systems are used by the semiconductor industry for integrated circuit fabrication. The systems are used in one part of the sequence of manufacturing steps that transfer a pattern formed from a layer of photosensitive material, the photoresist, to a layer that makes up a permanent part of the finished device.

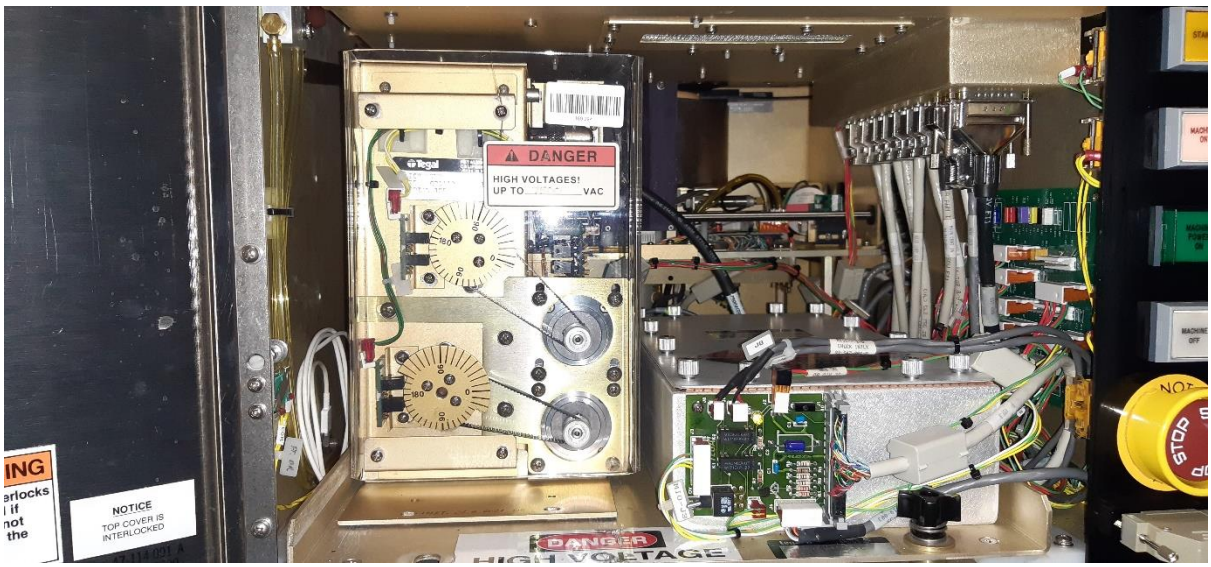
Wafers in the 90Xe are transported to a Reaction Chamber. A gas mixture is introduced into the Reaction Chamber, and the gas mixture is caused to become reactive by the application of radio frequency (RF) electromagnetic radiation. The reactive mixture, or plasma, etches away material that is not covered by the masking photoresist. The etch process is terminated at an appropriate time, the wafer is unloaded from the Reaction Chamber, and a new wafer is introduced. The cycle repeats.

The Tegal 90Xe System Plasma/RIE etchers have been configured to take advantage of the characteristics of plasmas for etching various films. Each of the models in the 90Xe family have been optimized for specific etches of specific films. All models have the common ability to implement multi-step etch recipes using multiple process gases. An optical monitoring system provides a means for determining etch completion so that the etch process may be terminated.




Substrate Positioning Processing directly on cooled wafer chuck.

RF Matching Network 13.56 MHz fully automated.



Solid State RF Generator ENI ACG-10B 13.56MHz. RF power: 50 to 1000 watts




Typical Temperature controller with Julabo chiller 0-80°C.



Original AC/DC power supply Tegal box.
Gas Control, 4 independent gas line with 4 MFCs (Customized).




Pressure Control Accurate, closed-loop pressure control with UPC and MKS Baratron capacitance pressure manometer. Process pressure 0 - 5000 mTorr.



Front and rears touch screen monitor Tegal 90X Integrated Flat Panel Display • On-Screen 9XX System Schematics • Repair & Maintenance Data Files Included.

Real-Time graphics Endpoint display.




System functions Real-Time process data acquisition on display.

Optical Endpoint Parameters. Absolute endpoint time system.

Timed cycles up to 4 hour each

Wafer quartz pins up/down

Calibration and Built-in diagnostic functions.

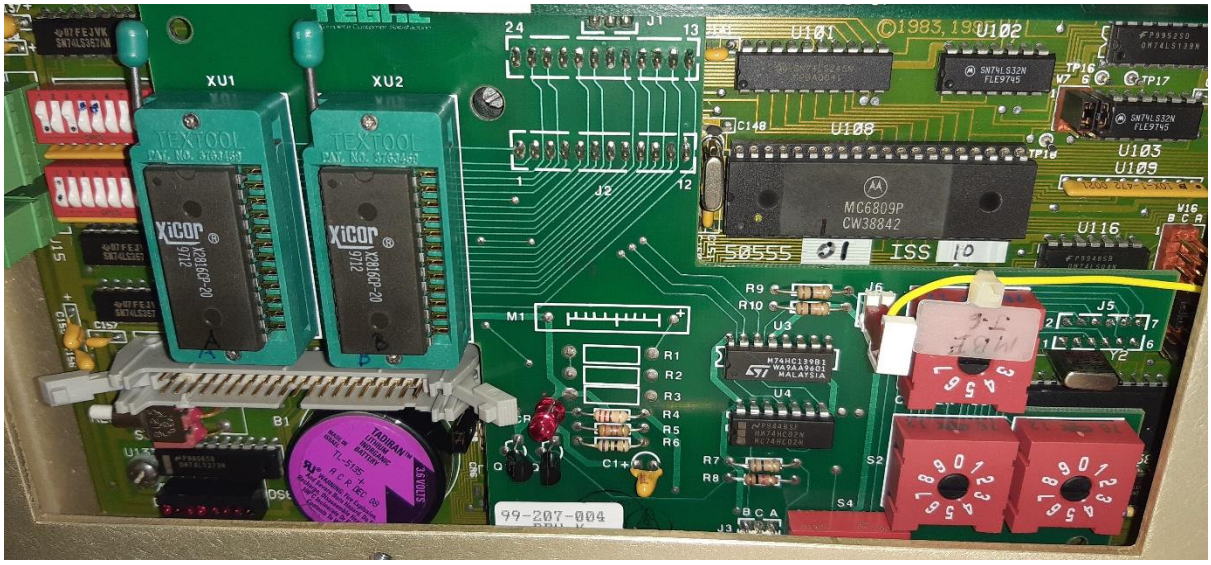
Recipe creation for fully automatic wafer processing.

SEC/GEM communication function Rev. II

Multi level password protections.

Storage of 20 recipes.

Configuration system, Process Data and Recipe storage on a EEprom.




## Physical Specifications Main Unit:

44"W x 42"D x 26"H  (112cm x 107cm x 66cm)

Weight: 500lb (227kg)

NOT INCLUDE VACUUM PUMP AND CHILLERS.

## Facility Requirements

Electrical: 200-240 VAC selectable frequency (50/60Hz.), 30A, 3 wire, single phase and 2 pole. Requires high in rush circuit breaker (not supplied).

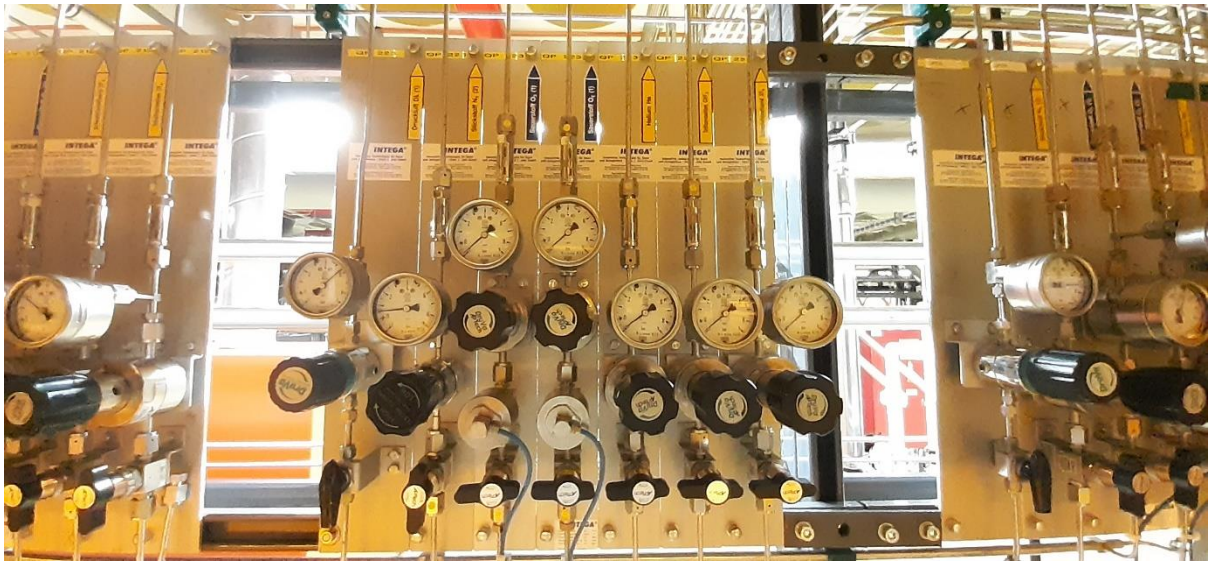
Cooling Water:
**Tegal®901e** a Single channel circulating Julabo chiller.
**Tegal®903e** a Double channel circulating Julabo chillers.
Distilled water only, cap. 2.8 gal., outlet pressure: 40 psig, 45 psig max.,
temp range: 0 to 80 deg.°C, Flow connecting hose must withstand coolant
at 40 psig at 80 deg.°C. Use " tubing rate: at 40 psig= 0.4 +/-.05GPM (2 LPM +/- 1).

CDA: CDA/N2 for pneumatics 80 +/- 5 psig, filtered and dry., 4" standard brass compression type fitting (Swagelok).

Reactor Vent/Purge and Ballast: N2 10-30 psig filtered and dry.

Gasses:
Gas 1: 15-20 psig +/- 5psig Gas 2: 15-20 psig +/- 5psig –
Gas 3: 15-20 psig +/- 5psig Gas 4: 15-20 psig +/- 5psig

Clean channel needle valve O2 = 20-30 psig +/- 5psig



Exhaust: Cabinet exhaust: 100 CFM (2.832 LPM) min. OD= 4.0"

# Typical Process

**Tegal®901e:**

| Material Etched: | **Polysilicon** | **Nitride** | **Photoresist** |
|---|---|---|---|
| Main Etchant Gas(es): | SF6, 02 | SF6, 02 | |
| Typical Process Pressure: | 200-450 mTorr | 250-350 mTorr | |
| Typical RF Power Level: | 100-250 watts | 200-300 watts | |
| Typical Temperature: | 22° - 30°C | 22° - 30°C | |

**Tegal®903e:**

| | |
|---|---|
| Material Etched: | **Silicon Oxide, Polyimide, SOG, PECVD Nitride (topside)** |
| Main Etchant Gas(es): | CHF3, SF6, Helium |
| Typical Process Pressure: | 1600-3000 mTorr |
| Typical RF Power Level: | 400-600 watts |
| Typical Temperature: | Upper Electrode 24/30 °C –Lower Electrode 19/23°C. |