

NLD/ALD HARDWARE PATENT PORTFOLIO

Over the past decade, in conjunction with the Nanolayer Deposition Development program, Tegal engineers developed a number of patented hardware features for enhancing the process, hardware functionality, and serviceability of nanolayer deposition and atomic layer deposition systems.

The resulting patent portfolio from this development program includes enhancements to the delivery of ALD and NLD deposition precursors, showerhead design, chamber shielding, cold trap design, pivoting chamber designs, an inductively coupled plasma source, and other hardware features applicable to atomic layer deposition.

PRECURSOR DELIVERY

6,488,272

6,572,706

PRECURSOR EXHAUST

6,998,097

7,425,224

SHOWERHEAD

6,565,661

6,444,039

CHAMBER SHIELDING

6,221,166

6,844,527

7,049,549

6,440,219

7,115,169

6,641,672

VISIBLE COLD TRAP

6,800,254

PIVOTING CHAMBER LID

6,609,632

7,074,278

RADIATION GUIDE

6,859,262

ASSEMBLY LINE AND 2-CHAMBER PROCESS HARDWARE

6,858,085

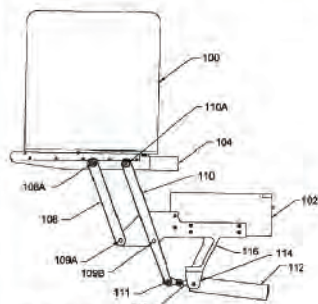
6,921,555

7,153,542

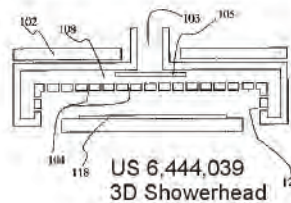
ICP SOURCE DESIGN

7,678,705

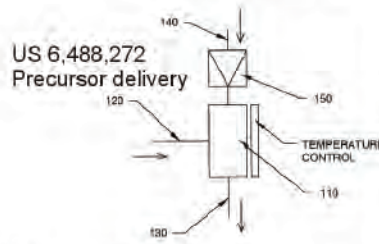
Examples from portfolio:



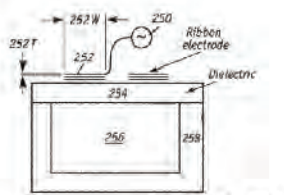
US 6,609,632
Pivoting chamber lid



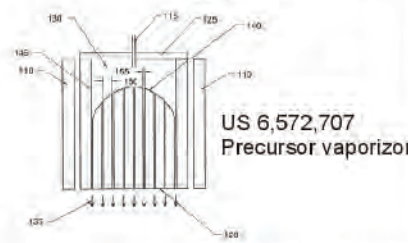
US 6,444,039
3D Showerhead



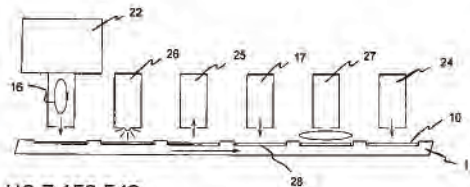
US 6,488,272
Precursor delivery



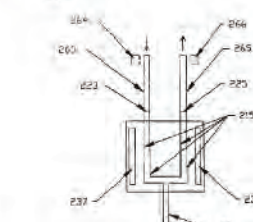
US 7,678,705
ICP Source



US 6,572,707
Precursor vaporizer



US 7,153,542
Assembly line process



US 6,800,254
Visible cold trap

Nanolayer Deposition Patents are applicable to Atomic Layer Deposition Hardware



CONTACT: Robert Ditzio, Senior Director, R&D | Tegal Corporation
140 Second Street, Suite 318, Petaluma CA 94952 | 707 765 5617 | rditzio@tegal.com
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