## Tank Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Liquid Capacity (liters)</th>
<th>Capacity (wafer boats)</th>
<th>Process Vessel Internal Dimensions (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QRT/S-A1002-11</td>
<td>11</td>
<td>2 - 100mm</td>
<td>Length 11.5, Width 7.5, Depth 7.8</td>
</tr>
<tr>
<td>QRT/S-A1252-14</td>
<td>14</td>
<td>2 - 125mm</td>
<td>Length 13.5, Width 7.5, Depth 8.5</td>
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<tr>
<td>QRT/S-Q1501-13</td>
<td>13</td>
<td>1 - 150mm*</td>
<td>Length 9.9, Width 8.0, Depth 9.5</td>
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<tr>
<td>QRT/S-A1502-10</td>
<td>18</td>
<td>2 - 150mm</td>
<td>Length 16.0, Width 8.0, Depth 9.6</td>
</tr>
<tr>
<td>QRT/S-A2001-25/11</td>
<td>25</td>
<td>1 - 200mm</td>
<td>Length 12.0, Width 11.0, Depth 11.5</td>
</tr>
<tr>
<td>QRT/S-A2001-25/12</td>
<td>25</td>
<td>1 - 200mm</td>
<td>Length 11.0, Width 12.0, Depth 11.5</td>
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<tr>
<td>QRT/S-A2001-34</td>
<td>34</td>
<td>2 - 150mm or 1 - 200mm</td>
<td>Length 16.0, Width 10.5, Depth 12.0</td>
</tr>
<tr>
<td>QRT/S-A2002-51</td>
<td>51</td>
<td>2 - 200mm</td>
<td>Length 21.5, Width 11.5, Depth 12.5</td>
</tr>
<tr>
<td>QZ-A1002-11</td>
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<td>Length 11.5, Width 7.5, Depth 7.8</td>
</tr>
<tr>
<td>QZ-A1252-14</td>
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<td>Length 13.5, Width 7.5, Depth 8.5</td>
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<tr>
<td>QZ-A1254-27</td>
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<td>4 - 125mm</td>
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<tr>
<td>QZ-A1501-10</td>
<td>10</td>
<td>1 - 150mm</td>
<td>Length 7.0, Width 7.0, Depth 9.6</td>
</tr>
<tr>
<td>QZ-A1502-18</td>
<td>18</td>
<td>2 - 150mm</td>
<td>Length 16.0, Width 8.0, Depth 9.8</td>
</tr>
<tr>
<td>QZ-A2001-25</td>
<td>25</td>
<td>1 - 200mm</td>
<td>Length 12.0, Width 11.0, Depth 11.5</td>
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<tr>
<td>QZ-B2001-34</td>
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<td>QZ-A2002-51</td>
<td>51</td>
<td>2 - 200mm</td>
<td>Length 21.5, Width 11.5, Depth 12.5</td>
</tr>
</tbody>
</table>

## Unique Boiling Point Control

IMTEC's O.N. Nitride-Etch Accubath system provides the industry's tightest, most predictable process control. This state-of-the-art control is by far the most effective, reliable and safest method for Si₃N₄ etching. Our company has accomplished this procedure by providing actual acid concentration and boiling point control in an extremely efficient self-balancing reflux system.

## Design Concept

The customer-selected process temperature for the desired nitride etch rate and selectivity is best attained by a balance of three factors: optimum (high) process temperature, acid concentration and the highest water fraction. (Highest water fraction for a selected process temperature is coincident with the chemistry boiling point.)

In nitride-etching, a specific acid concentration is picked for selectivity - and semiconductor process is then conducted for fastest etch rate for that acid concentration at the highest attainable temperature (at standard pressures): its boiling point.

We have developed a special nitride controller that senses and maintains the chemistry boiling point (rather than the process bath temperature). IMTEC's advanced controller provides the manipulation of the significant nitride-etch control parameters: the phosphoric acid concentration, boil rate and boiling point temperature.

## Customer Benefits

The unique new quartz-nitride control system from IMTEC provides the semiconductor process user with the following twin benefits:
- Process uniformity.
- Lot-to-lot repeatability.

## Prevents Stratification

IMTEC's well-tested and proven control technique virtually eliminates the all-too-common problem of semiconductor bath stagnation which results from the loss of boil. The previous safety risks of water stratification become insignificant when using our control system.
PROCESS INTEGRITY OPTIMIZED SEMICONDUCTOR WAFER-ETCH PROCESS FOR THE HIGHEST ETCH RATES.

- CONTROL: The preset process boiling point is maintained to ± 0.2°C.
- STABILITY: Keeps the correct phosphoric acid (H3PO4) concentration and boil rate.
- ACCURACY: Monitored by RTD standard process sensor (thermocouple optional).

THERMAL UNIFORMITY HEATING:
- Heating: Inconel heaters - sized, shaped and located to give uniform boiling rate throughout the tank. Temperature uniformity at the boil condition is better than 0.5°C with the boiling point kept within 0.2°C.
- INSULATION: Alumina-silica, integrated with the bath and heater design to conserve energy and contribute to uniform heat distribution.

ELECTRICAL SERVICE
200-240 VAC, single-phase, 50/60 Hz, up to 20 amp††. 1Available option: 24-VAC switching remote relays. 1†For IMTEC nitride baths drawing more than 20 amperes and for 24-VAC switching, special circuitry requirement data is available from our Engineering Department; also, IMTEC-designed relay modules are available.

RELIABILITY
- Experience: 20-plus years in quartz vessel design and manufacturing, consistently supplying state-of-the-art products.
- Heaters: Patented, long-life design.
- Reduced Cycling: Efficient condensing helps to maintain stability of chemical concentration and smooths “bang-bang” heating cycles.
- Reduced over-temperature sensors.

CONFIRMING A QN SYSTEM
Configuring a Quartz Nitride system requires that it be a “closed bath”. Starting with a standard IMTEC QZ or QRT/S tank, add a quartz collar and lid. The collar is water-cooled, using integrated condensing coils. A flowmeter regulates cooling. IMTEC’s Q952 Controller is used with the QN system.

COLLAR (LID CHOICES)
The water-cooled quartz collar must be utilized with a lid. IMTEC offers side or end-opening Autolids (water-pressure-driven; reed switches indicate “Closed” and “Full Open” positions to customer’s robot system). Autolids incorporates a chemically impervious membrane. Alternatively, IMTEC can supply a similarly constructed manual hinged lid.

FLOW METER
A dual-panel flowmeter regulates the cooling water to the collar and sets the rate of the liquid drip into the semiconductor process bath which is then automatically adjusted and controlled by the QN controller.

CONTROLLER
IMTEC’s Model 952 is the designated controller for our quartz nitride systems. Its unique software senses, adjusts and controls the boiling point of the process chemistry. The 952 Controller is extremely simple to use: all of the interfaces are pre-wired for nitride etch applications. (All of the required system components and their interfaces are provided.) Read the instructions, select the desired process parameters and you can literally plug-and-go!

952 OPERATION – CONTROL PANEL
This process controller uses a special software protocol as part of the IMTEC proprietary control algorithm. A photo-isolated 20 amp triac powers the bath heater. (Nitride baths requiring more than 20 amperes utilize power-switching relays - these may be supplied by the customer or by IMTEC as a power module.) D.I. water solenoid is actuated by a controller 24-VAC power module.††, single-phase, 50/60 Hz, up to 20 amp††, D.I. water solenoid is actuated by a controller 24-VAC power module.††, single-phase, 50/60 Hz, up to 20 amp††.

RTD TEMPERATURE SENSOR
An 100-ohm, Teflon®-encapsulated, platinum-wire Resistance Temperature Detector (RTD) calibrated to the American standard (0.003916 ohm/°C) is provided by IMTEC as the recommended nitride process temperature sensor. The utilization of J-type thermocouples is optional and must be customer-specified at the time of ordering the controller.

LIQUID LEVEL SENSORS
Two liquid level sensors can be used with these sensors probes mounted in a “Low-Low” tank configuration. This will prevent overflow of bath solution and also

DISPERSION PLATES
A dispersion plate can be mounted in the bottom of a QRT/S bath process vessel to improve improved flow distribution of the incoming filtered chemistry. Also, the liquid dispersion plate may have a gas manifold added if nitrogen or other gas agitation should be desired.

FUNCTIONAL PERFORMANCE
Controller Temperature Range: 0° to 249.9°C System Operating Temperature Range: 28° to 190°C. Process Set-Point (Boiling Point) Accuracy: ±0.2°C. Bath Liquid Temperature Uniformity at Bolt: ±0.5°C.

MATERIALS

IMTEC is a registered trademark of E.I. du Pont de Nemours and Company.