



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY**  
**MATERIALS MANAGEMENT DIVISION**  
Powai, Mumbai 400076.

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**Technical Specifications of Semiautomatic Gas Supply Panels for SiH<sub>4</sub>, NH<sub>3</sub>, PH<sub>3</sub> and B<sub>2</sub>H<sub>6</sub>:**

1. The following is the technical specifications of Coaxial lines with semi-automatic gas panel for two PECVDs at NCPRE fabrication laboratory, IIT Bombay.
2. Bidders will install the gas panels and coaxial lines with below mentioned specifications on the existing gas cabinet of customer. All bidders will inspect the site and take the final measurement before submission of bid. Bidders should provide detailed drawing of gas panels along with technical bid.

Sr. No.		Qty	Unit	Compliance (Yes/No)
1	<p><b>Semiautomatic Gas Supply Panels for SiH<sub>4</sub>, NH<sub>3</sub>, PH<sub>3</sub> and B<sub>2</sub>H<sub>6</sub>:</b></p> <ol style="list-style-type: none"><li>1. Suitable Tied Diaphragm Pressure Regulator with flow rate - 0 to 5 SLPM.</li><li>2. All panels shall be supplied with 0.5 micron filter at inlet side and 0.003 micron filter at outlet.</li><li>3. Inlet &amp; Outlet pressure gauge must be contact gauges. Signal from gas leak detector, outlet contact gauge and signal from other field instruments on gas panel must be interlocked with automatic valve to isolate the gas supply in the event of gas leak detection. A Cause and Effect matrix must be established to take action in the event of signals fro field instruments.</li><li>4. Venturi operated purge-vacuum system to remove entrapped moisture before charging corrosive gases and suitable provision to ensure impurity free delivery of high purity gases to the process without any contamination.</li><li>5. Necessary isolation VCR diaphragm type valves for Pneumatic, Venturi, Purge and process gases.</li><li>6. Sample / He leak check port with NRV shall be provided.</li><li>7. High pressure vent for quick efficient purging of pigtail &amp; high pressure side of panel.</li><li>8. Excess Flow switch SS316LEP (Electro polished) with VCR End must be provided. Signal from excess flow switch should be interlocked with automatic valve to isolate the gas supply.</li><li>9. Emergency shut off valve at the inlet of the panel that can be activated during any life safety warnings coming from process and facility conditions. The emergency shut off</li></ol>	4	Each	

	<p>valves shall be pneumatically operated with external solenoid.</p> <p>10. SS Pigtail made of SS316L EP tube with cylinder connectors (CGA/DISS) as per cylinder standard.</p> <p>11. The supply panel shall be monitored for life safety situations. It shall, in the event of gas leak, exhaust failure, rate of rise and fire etc. take necessary actions to prevent damage and auto shut off shutdown during any exigency with alarm hooter.</p> <p>12. Gas Leak Detectors for the other gases shall be supplied by customer and to be installed by bidder.</p> <p>13. A common control panel to be placed at suitable location close to the existing gas cabinet.</p> <p>14. Valves shall be connected to the common control panel and eventually connected to existing control panel.</p> <p>15. All the internals of components shall be electro polished with surface roughness of 10 micron or less. The contamination should be controlled during the installation by following semiconductor installation procedures (SEMI guidelines).</p>			
2	<p><b>Single Cylinder Gas supply Panel for N<sub>2</sub> , 1/4" SS 316 LEP Tube:</b></p> <p>1. High-pressure vent of gas lines carrying gases is mandatory.</p> <p>2. Panels have high pressure isolation VCR diaphragm valve.</p> <p>3. High pressure vent VCR diaphragm valve.</p> <p>4. Process isolation VCR diaphragm valve.</p> <p>5. Safety relief valve with VCR end connection.</p> <p>6. SS316L EP (Electro polished) Pressure Regulator with flow rate- 0 to 5 SLPM.</p> <p>7. Inlet &amp; Outlet pressure gauge.</p> <p>8. SS Pigtail made of SS316 LEP (Electro polished) tube with cylinder connectors as per cylinder standard.</p> <p>9. All fittings shall be SS316 LEP (Electro polished) micro fittings and every component shall have VCR/Weld end connection.</p>	30	m	
3	<p><b>Tubing Material / Type:</b></p> <p>1. 1/2" x 1/4" SS316L, electro-polished, coaxial Tube &amp; fitting, 10μ Ra max. Tubing for hazardous gasses Co-axial pressure switch shall be considered.</p> <p>2. Co-axial pressure switch (vacuum monitoring) with two port diaphragm valve for co-ax filling/evacuation</p> <p>3. 1/4" OD X 0.039" WT Seamless EP (electro polished) tube, SS316L, 10μin Ra max tubing for non hazardous gasses.</p> <p>4. All Valves fitting: SS 316 L EP electro polished. End</p>	60	RMT	

	connection: VCR as required			
4	<b>Exhaust work:</b> <ol style="list-style-type: none"> <li>1. Exhaust ducts from the cabinet to existing main line</li> <li>2. Vent line from GC to be connected to existing gas scrubber</li> <li>3. Exhaust blower is available</li> </ol>	1	Set	
5	<b>PLC based control Panel:</b> With necessary I/O cards to get signal from field instruments - GLD, UVIR, ROR sensors, solenoid valves, Audio-vision alarm unit and emergency shut of button Automatic valves on gas control panel shall be actuated by the control panel. Installation of Gas Control Panel with automation for GLD's and Coaxial pressure switch. Signal from GLD, s and Pressure Switch shall be transmitted to actuate the alarm and shut-off the automatic valves of respective gas supply panels.	1	Each	
6	<b>N2 purge Panel:</b> All fittings shall be SS316 LEP (Electro polished) micro fittings and every component shall have VCR/Weld end Connection	1	Each	
7	<b>Coaxial Pressure Switch:</b> Coaxial pressure switch shall be used to monitor the vacuum maintained in the annular space of the coaxial tubing. The typical coaxial pressure switch consists of 2 isolation valves and a pressure switch. This is a critical component that is to be used on all coaxial tubing lines.	6	Each	
8	<b>SS tube clamps:</b> Unistrut for tube support system, gas line tags, cable tray, hardware items etc.	1	Lot	
9	<b>Testing and Validation</b> The gas lines (Single and co-axial) to be tested and validated for pressure, particles, leak, oxygen, and moisture as per SEMI standards. Certificates of validation to be provided by the vendor: <ol style="list-style-type: none"> <li>1. Pressure test- Tubes to be held pressurized at 1.5 times the operating pressure and tested for at least 24 hours (0 psi drop).</li> <li>2. Helium leak test- to be carried out and the lines should hold at least <math>10^{-9}</math> mbar. ltr/sec</li> <li>3. The bidder must carry out the installation as per semiconductor facility standards and purge the line to ensure the integrity of gas lines.</li> </ol>	1	Lot	
10	<b>Gas Leak Detectors for PH3</b>	1	Each	
11	<b>Installation of Gas control Panel</b> <b>Installation of Gas control panel with automation for GLD's and coaxial pressure switch.</b> <b>Signal from GLD's and pressure switch shall be transmitted to actuate the alarm and shut-off the automatic valves of</b>	1	Set	

	<b>respective gas supply panels.</b>			
12	<b>UV IR flame detector for the gas cabinet</b>	1	Each	
13	<b>Installation of gas lines Using orbital welding technology and as per semiconductor industries guidelines.</b>	1	Set	
14	<p><b>Qualification Criteria (All relevant documents to be attached in the technical bid):</b></p> <p>3. The bidder must have atleast 2 recommendations from government institutes or R&amp;D centers stating that bidder has successfully completed project involving similar hazardous gases at the recommending institution's facility and the systems are in use.</p> <p>4. The bidder must have a class 100 clean room facility in India where the assembly of panels is performed.</p> <p>5. The bidder must not have incurred a loss during the last 3 years. The Audited balance sheets are too be submitted along with the bid.</p> <p>6. The bidder must have established office in India for at least 3 years.</p> <p>7. The bidder must have completed at least 2 successful similar projects in government institutes such as IITs, NITs, DRDO, IISc, CSRE labs. PO copies of same to be attached with the bid.</p> <p>8. <b>Warranty:</b> 18 Months from date of supply for material.</p>	1	Each	