

Procedure no. ZP/56/008/D/22

Attachment no. 7 to ORS

### Detailed Description of Subject of Procurement

#### Fully Automated Fuel Cell Test Station:

Subject of the procurement	Quantity
<b>Technical documentation</b>	1
<b>Fully Automated Fuel Cell Test Station:</b> <ul style="list-style-type: none"> <li>- 100:1 turndown (max:min flow) on all Mass Flow Controllers (MFC),</li> <li>- 80 NLPM max. humidified anode flow, 1 x MFC: H<sub>2</sub>,</li> <li>- 200 NLPM max. humidified cathode flow, 1 x MFC: Air,</li> <li>- 316 stainless steel (or higher grade) for all di-water and humidified gas-handling components,</li> <li>- Automatic contact humidification module (up to 90C dew point, higher temperatures available),</li> <li>- Contact Humidification with Rapid Response Dew Point for both anode and cathode sides. 1-2 second dew point transient response time for pure H<sub>2</sub> and pure Air streams,</li> <li>- Automated bypass with 100% full isolation of humidifier which permits delivery of facility-supplied gas directly to stack,</li> <li>- Electric reheat module (up to 110C inlet gas),</li> <li>- Nitrogen purge rotameters on anode and cathode, activated on e-stop or user command,</li> <li>- Automatic back pressure control module (0-3 Barg),</li> <li>- Exhaust cooling heat exchangers,</li> <li>- Stack end-plate heater PID controllers, 2x 2A max. (1ph AC mains voltage),</li> <li>- Automated liquid coolant/heating module with conductivity monitoring: 0.5-5 LPM, 40-90C, 0-3 Barg,</li> <li>- Programmable air cooled load bank with dual range operation (10%/100%). Maximum: 2KW, 75V, 350A, max. current available down to ~0.0V at stack</li> <li>- Load bank with an analogue input for an external AC perturbation signal</li> <li>- Load bank dynamic response: min. 10KHz,</li> <li>- 20 channels of CVM (Cell Voltage Monitor) included (+/- 5V range, +/- 1mV accuracy),</li> <li>- Automation software,</li> <li>- H<sub>2</sub> gas detector (CE, ATEX, UL, CSA) for test station E-stop and warning,</li> <li>- Facility requirements: 3 phase electrical power, pressurized fluid supplies (di water, cooling water, reactant gases), exhaust gas handling, water drain, flammable/hazardous gas detection, fume extraction,</li> <li>- 3 Gas lines of CO, CO<sub>2</sub>, CH<sub>4</sub> includes bulkhead connector, safety shutoff valve and 1 MFC),</li> <li>- 2 Gas lines for corrosive gases, H<sub>2</sub>S, NH<sub>3</sub> includes bulkhead connector, safety shutoff valve and 1 MFC,</li> <li>- Possibility of Dead Ended Operation,</li> <li>- Bypass ion filtration system on coolant loop. For deionized water or WEG operation,</li> <li>- Integrated Carbon Monoxide detector, CE, ATEX rated,</li> </ul>	1



**POLITECHNIKA  
GDAŃSKA**

WYDZIAŁ CHEMICZNY



**UCZELNIA  
BADAWCZA**  
INICJATYWA DOSKONAŁOŚCI

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| <ul style="list-style-type: none"><li>- User training,</li><li>- CE marking and conformity,</li></ul> |  |
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