# PEM Test Station – Technical & Scientific Profile Sheet

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| **Category** | PEM Electrolyser Test Station |
| **Equipment Name** | PEM Test Station |
| **Domain** | Hydrogen storage, electrochemistry, renewable energy, materials testing |
| **Location** | Université du Québec à Trois-Rivières (UQTR) |
| **Responsible** | Dr. Samaneh Shahgaldi |
| **Contact Information** | samaneh.shahgaldi@uqtr.ca |
| **Access** | Available upon request. Training and authorization required. Open to students, internal researchers, and external collaborators (industry and universities). |

## Equipment Description

The PEM Test Station is a versatile research platform designed for evaluating proton exchange membrane water electrolyzers (PEMWEs) under various operating conditions. It enables precise control of electrical, thermal, and fluidic parameters, making it suitable for performance testing, durability studies, and materials development. The system supports both single cells and small stacks, allowing advanced testing of conventional and novel PEMWE materials.

## Technical Specifications

• Power: up to 200 A, 6 V (preferred < 2.2 V), 1200 W

• Pressure: 5 Barg (Anode and Cathode)

• Temperature: Up to 80 °C (Anode and Cathode)

• Water flow rate: up to 2.5 LPM (Anode and Cathode)

• Hydrogen flow rate: Dual Calibration Flow range – 0.056 - 2.8 NLPM, and 0.014 - 0.73 NLPM (Accuracy: ±0.5% of reading plus ±0.1% of calibrated full scale)

• Cell type: Single cell electrolyzer or 3 cell electrolyzer stack

• Material type: Conventional PEMWE materials (Ti, SS, Pt, Ir, Ru, Nb, Ta, C etc.)

## Operational Modes & Safety Features

• Operating modes: Continuous, cyclic, transient, and customizable

• Real-life simulation: Frequent start/stop cycles supported

• Integrated safety measures: $H_2$ Sensor, SOV valves, Emergency Stop (E-stop), Mass Flow Controllers (MFCs), and Mass Flow Meters (MFMs)

• Limitations: Water mass flow > 0.1 NLPM, $N_2$ > 4.5 Barg; Recommended maximum continuous duration: 1 week (followed by 5 hours rest). Extreme conditions are technically possible but not recommended.

## Experimental Applications

• Durability, efficiency, and stability testing

• Long-term performance assessment (depending on mass supply)

## Projects and Collaborations

• More than 5 ongoing research projects are currently using this station

• The equipment has been used in collaborations with other teams and partners

## Accessibility and Users

• Students are actively working with this station

• Access is available to internal and external users, including industry and universities

• Required steps: Training and authorization (contact Dr. Samaneh Shahgaldi)

**New Opportunities with Our PEM Test Station at UQTR!**

At Université du Québec à Trois-Rivières (UQTR), we are proud to offer access to our PEM Electrolyzer Test Station a cutting-edge platform for research in green hydrogen, electrochemistry, and renewable energy systems.

- With advanced control of power, pressure, temperature, and hydrogen flow, this station enables high-precision testing of single cells and small stacks. It is ideal for projects on durability, efficiency, and materials development in PEM water electrolysis.
- Open for students, researchers, and external collaborators from industry and academia.
- Interested in collaborating? Contact Dr. Samaneh Shahgaldi (samaneh.shahgaldi@uqtr.ca).