

Engineered and manufactured gas and liquid process solutions

LECTRODRYER

Adsorption technology experts since 1932

HPS HYDROGEN PURIFICATION SYSTEM

The HPS Lectrodryer is specially designed for purifying hydrogen generated by electrolysis. The HPS

Lectrodryer can be used with all methods of hydrogen production and optimized for the generation method.



Key features

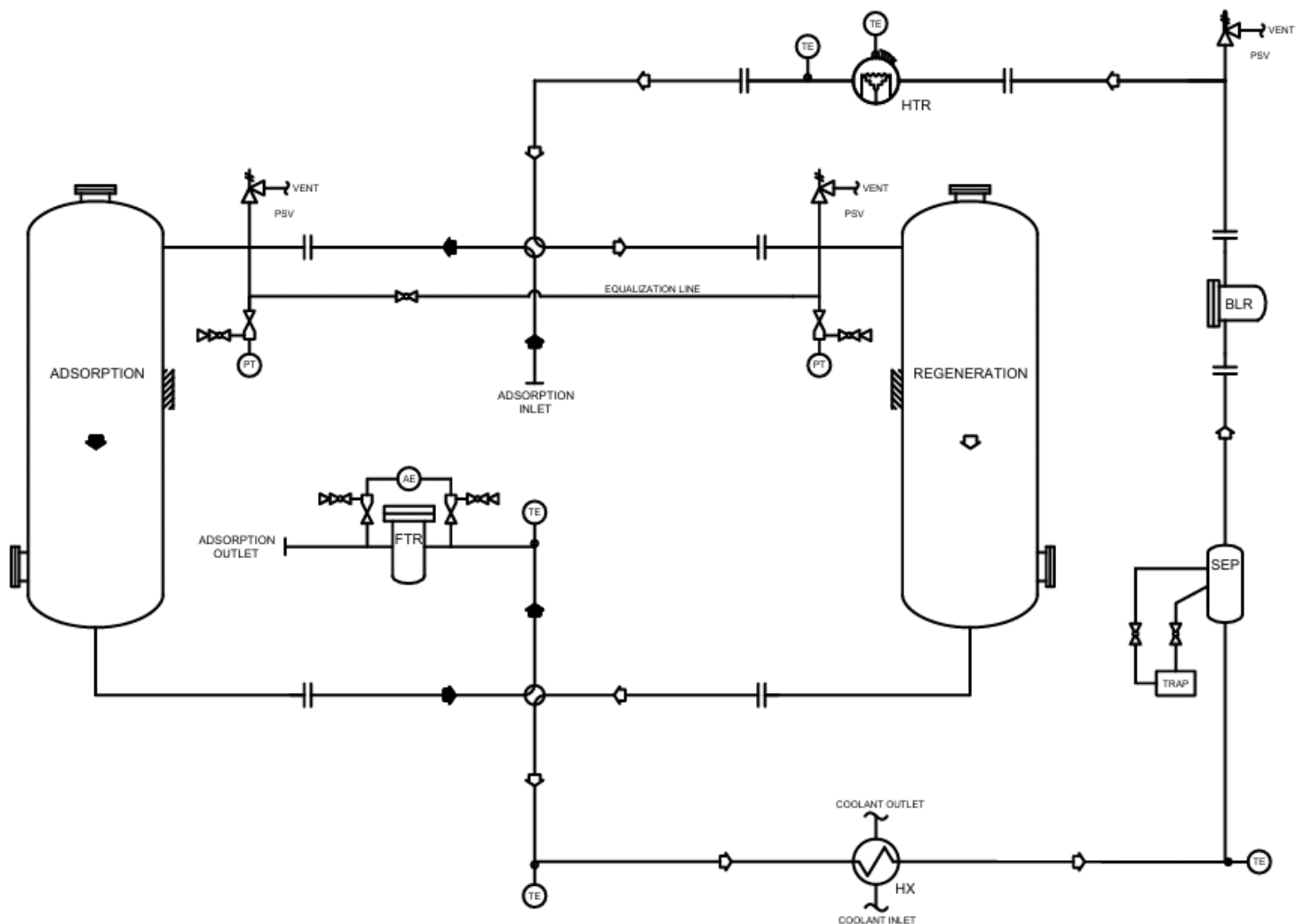
- ≤ 5 ppmv outlet moisture content
- Systems up to 10MW, scalable up to 100MW
- Flexible operating flow range from 10–100%
- Meets ISO 14687 and SAE J2719
- Zero hydrogen loss for regeneration
- Proprietary vessel design
- Isolation and standby option for process flexibility
- Demand-based extended adsorption cycles
- SIL 1 Ready option
- Optimized to maximize energy savings

Current designs pair with electrolyzer sizes from pilot to 10 MW and are scalable to 100 MW. Flowrates up to 5000 Nm³/hr with a wide pressure range. Removal of moisture and other contaminants like oxygen allows the hydrogen product to meet ISO 14687, SAE J2719, and other hydrogen quality standards. Dual tower, heat-reactivated design allows for continuous operation and purification. The closed-circuit design utilizes a captive volume at line pressure so no loss of process gas is required for reactivation of the adsorbent. Proprietary vessel design can allow for turndown as low as 10% of normal flow. Custom units available.

Here's how the HPS works

- A. Adsorption column of the dual tower purifies the hydrogen gas as it passes through the adsorbent bed.
- B. Regeneration column performs reactivation by means of a motor-driven blower that circulates a captive volume of gas through a heater and adsorbent tower. The desorbed moisture will be condensed by a water-cooled heat exchanger and then separated and trapped for removal.
- C. Once the adsorption cycle is deemed complete, the process switches to the previously regenerated column.

Process and Instrumentation Diagram



Standard features include:

- Motor-driven circulating blower
- Water-cooled heat exchanger
- Separator and condensate trap
- Over-pressure relief valves for each adsorber
- Control Box with PLC/HMI
- ASME/PED Code vessels
- Over Temperature Protection of the Heater
- Pneumatic Actuation
- Outlet Particulate Filter
- Outlet Dewpoint Monitoring

Options available:

- Containerized ready skid
- Deoxygenation Reactors
- Oxygen Analyzer
- Inlet Heat Exchanger
- Remote or On-board Chiller System
- Inlet Hydrogen-Water Separator
- Electrical Actuation
- DCS Control Option
- SIL 1 compliant safety control package
- Demand-based extended adsorption cycles
- International Certifications

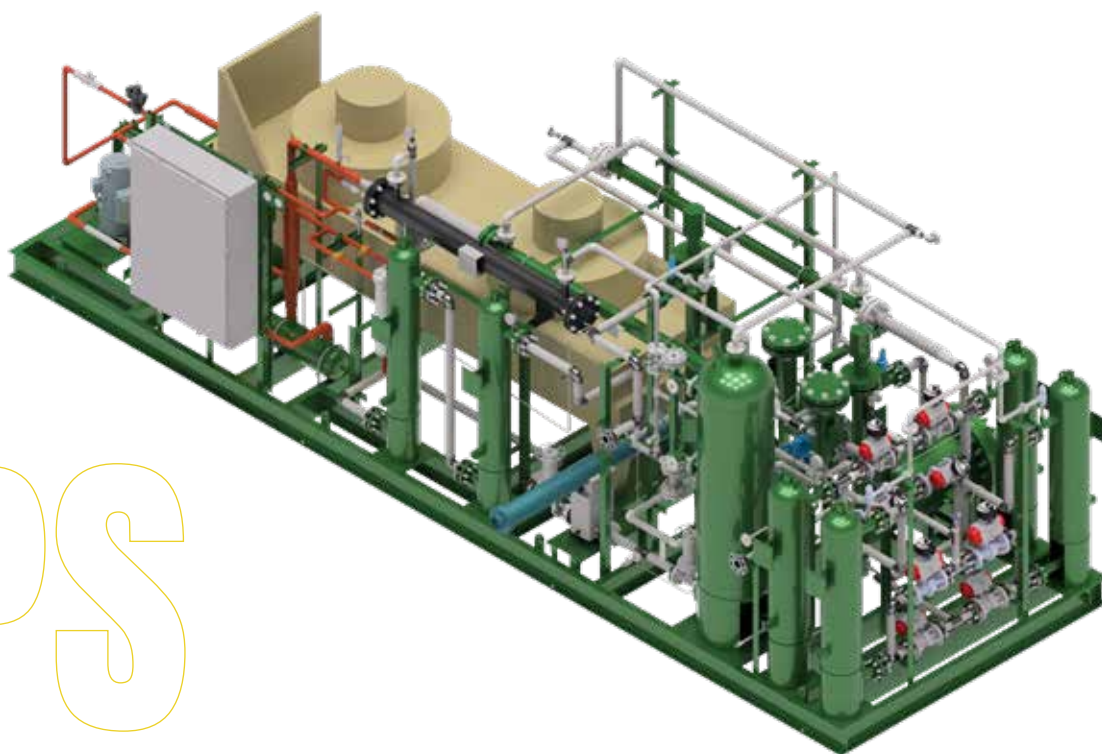
Sizing of HPS Lectrodryer

Every HPS Lectrodryer configuration is sized to your electrolyser conditions and compliance requirements. To size the system, we typically need:

- Flow rate
- Inlet temperature and pressure
- Inlet moisture (or saturation condition)
- Target outlet dew point or moisture content (ppmv)
- Oxygen target (if required)

Typical, but not limited to, application conditions:

Flowrate	250 – 5000 Nm ³ /hr (22–425 kg/hr)
Temperature	4 °C – 70 °C (40 °F – 158 °F)
Pressure	1 barg – 64 barg (14.5 – 873 PSIG)
Inlet Moisture Content	<= Saturated at Conditions
Desired Outlet Moisture Content	–105 °F to –40 °F (– 76 °C to – 40 °C) DP
Turndown Capacity	10 – 100 %



HPS

For applications outside these ranges, talk to your Lectrodryer representative



Brochure Rev. 1



LECTRODRYER

135 Quality Drive
Richmond, Kentucky 40475
P.O. BOX 2500
Richmond, Kentucky
40476-2602

www.lectrodryer.com

Phone +1 (859) 624 2091
Fax +1 (859) 623 2436
USA Toll Free +1 (877) 403 5215