



TEST LINE #5

Thermochemical water splitting

Technical data sheet
July 2025

H₂shift



Test Line 5: Thermochemical water splitting

Operating conditions		Notes
<i>Temperature</i>	<i>Value</i>	
Maximum process temperature [°C]	1700	
Minimum process temperature [°C]	20	Ambient temperature
Heating method [direct/indirect concentrated/diffuse]	Indirect Diffuse	
Heating source	Electric	Electric furnace with heating elements, 3.6 kW
Sensors [yes/no]	Yes	Furnace thermocouple
<i>Pressure</i>	<i>Value</i>	
Maximum process pressure [bar(a)]	1	Ambient pressure
Minimum process pressure [bar(a)]	1	Ambient pressure
Sensors [yes/no]	No	
Chamber layout, reactor configuration, samples, and similar		Notes
<i>Heated chamber layout and dimensions</i>	<i>Value</i>	
Layout [vertical/horizontal]	Horizontal	Tubular furnace with ceramic working tube and flanges
Test chamber shape [tubular, other]	Tubular	Tubular furnace with ceramic working tube and flanges
Test chamber diameter [mm]	40	
Test chamber length [mm]	1000	
Heated length [mm]	250	
Testing chamber heated volume [cm ³]	314	Results of heated length and diameter
<i>Samples and reactors</i>	<i>Value</i>	
Sample type	Solid/Liquid	Powder, pellets, solid/liquid samples can be tested if placed in a suitable sample holder or reactor
Reactor type hosted in the heated chamber	Any type that can fit in the heated chamber volume	Samples in sample holder can be also tested directly in the heated chamber without a reactor. Reactor materials must be compatible with heated chamber temperature.
Fluids		Notes
<i>Gases (inlet)</i>	<i>Value</i>	
Hydrogen [Nml/min]	0-500	Mass flow-controller, near-ambient pressure
Methane [Nml/min]	0-500	Mass flow-controller, near-ambient pressure
Carbon dioxide [Nml/min]	0-500	Mass flow-controller, near-ambient pressure
Carbon monoxide [Nml/min]	0-500	Mass flow-controller, near-ambient pressure
Nitrogen [Nml/min]	0-500	Mass flow-controller, near-ambient pressure
Argon (and argon mixtures) [Nml/min]	0-500	2 separate lines, Mass flow-controller, near-ambient pressure
Heating [yes/no]	yes	Heated lines up to furnace inlet
<i>Water (inlet)</i>	<i>Value</i>	
Water supply	Demi water tank	Nitrogen pressurized (5 bar tank), manual refilling with pump
Water flow control [g/h]	0-25	Coriolis flow controller
Water vaporizer [yes/no]	yes	Electric vaporizer, needs carrier gas
Sensors [yes/no]	yes	Liquid flow rate is measured and acquired
Heating [yes/no]	yes	Heated lines up to furnace inlet
<i>Gas/steam output</i>	<i>Value</i>	
Water condensation	yes	Lab water condenser (ambient temperature) and silica trap
Flow measurement	no	
Temperature measurement	no	
Gas analysis		Notes
<i>Instruments</i>	<i>Value</i>	
Continuous gas analyzer with IR/TCD sensors for specific gases	Yes	H ₂ , CH ₄ , CO, CO ₂ , O ₂ gas analyzer (dry gas), 0.2-1.5 L/min
Mass spectrometer	Yes	Dry/wet(mildly) gases
Gas chromatography	Yes	
Other	No	
Control and acquisition system		Notes
<i>Control system</i>	<i>Value</i>	
Programmable control system [yes/no]	Yes	Control system allows programmable cycles, can be modified
Remote control [yes/no]	Yes	Control system installed on local PC, possible remote control