



GIG KARASEK
A Member of Dr. Aichhorn Group



ECO2CELL

ECO2CELL Lab Plant

Electrochemical conversion of CO₂ into CO
on a laboratory scale

www.gigkarasek.com

ECO2CELL Lab Plant

Testing of electrochemical transformation of CO₂ into CO for industry and research

As an expert in industrial plants and pioneer in the field of **electrochemical conversion technology** GIG Karasek offers an innovative CO₂ transformation unit on a laboratory scale.

The ECO2CELL Lab Plant features state-of-the-art electroreduction technology and is based on our patented CO₂ valorization solution. The system is designed to be compact and efficient and enables comprehensive on-site testing for industry or research institutions.

How it works

The ECO2CELL Lab Plant uses **CO₂, water, and electricity** in an electrocatalytic process to produce valuable carbon monoxide (CO).

Electrochemical conversion - step by step

- ◆ **CO₂ preparation**
Processing of carbon dioxide to meet the requirements of the electrochemical cell
- ◆ **Electrochemical conversion**
CO₂ is converted into CO in the reactor using a catalyst and electricity
- ◆ **Product handling**
Storage of CO and handling of by-products
- ◆ **Monitoring and control**
Continuous process monitoring to ensure product quality and system efficiency

Components of the ECO2CELL Lab Plant	
Electrochemical conversion reactors	Core units for CO ₂ conversion
Gas handling system	Feed of CO ₂ , discharge of CO
Cooling/heating system	Ensures optimum operating temperatures
Control system	State-of-the-art automation for process monitoring and control
Safety system	Including alarms, shutdown systems and hazard controls

Mass balance

The process achieves an exemplary conversion rate, ensuring optimal utilization of CO₂. The system is designed for a standard input, yielding a high-purity CO output, with high purity by-products.

The detailed mass balance is as follows:

Mass balance		
*Dimensions are subject to change without notice. Scale-up possible!		
Input	CO ₂ gas	up to 300 L/h and 99.5% purity
Output	CO gas	up to 150 L/h
	By-products	up to H ₂ 20 L/h, O ₂ 188 L/h

Utility consumption

Our system is engineered for energy efficiency. The following utilities are consumed in the process:

Utility consumption		
*Dimensions are subject to change without notice. Scale-up possible!		
Electricity	1.5 kW	For electrochemical conversion
DI water	24 g/h	For water oxidation reaction
Other	KOH	For electrolysis as electrolyte

Layout plan

The layout plan presents details of the spatial arrangement of equipment and ensures optimum workflow and maintenance access. The lab plant is to be placed under a fume hood for safe operation.

Technical specifications	
*Dimensions are subject to change without notice. Scale-up possible!	
Required floor space for the standard system	6 m ²
Electrolyzer	Stack cell up to 450 cm ² total active area
Power supply	1.5 kW, 0-50 A, 0-30 V
Anolyte vessel	2.5 liters
Catholyte vessel	2.5 liters
Anolyte pump	up to 3.3 l/h
Catholyte pump	up to 3.3 l/h
Anolyte magnetic stirrer/heater	20 to 100°C, 800 W
Catholyte magnetic stirrer/heater	20 to 100°C, 800 W
Electrical supply to the plant	400 V, 50 Hz, 3 kW



- 1 Electrolyzer
- 2 Anolyte vessel
- 3 Catholyte vessel
- 4 Anolyte pump
- 5 Catholyte pump
- 6 Anolyte magnetic stirrer/heater
- 7 Catholyte magnetic stirrer/heater
- 8 Process instrumentation

P&ID (Piping and Instrumentation Diagram)

A detailed P&ID is provided, outlining the interconnection of equipment, instrumentation, and piping. The diagram is designed to be clear and easy to understand, ensuring smooth installation and operation.

Our scope of supply

- ◆ Design and Engineering
Detailed P&ID, layout plans, and process description
- ◆ Manufacturing of all equipment listed above
- ◆ Installation and on-site assembly of the system
- ◆ Commissioning and training
Ensuring your team is proficient in system operation

We support you with these additional services

- ◆ Development of customized CO₂ conversion solutions
- ◆ Design and construction of turnkey plants
- ◆ Process optimization and scale-up
- ◆ Consulting

Carbon dioxide - from problem to opportunity. Let's tap into this enormous potential together!

ADVANTAGES

- ◆ **On-site trials**
Test the CO₂ valorization at your production site or research institution!
- ◆ **Plug-and-play principle**
- ◆ **Patented technology**
- ◆ **Benefit from our experience** as industry experts and pioneers in electrochemical conversion technology
- ◆ **Scalability**
Easy scaling thanks to the modular design
- ◆ **Mild process conditions**
(ambient temperature and pressure)

LEARN MORE



Got questions? Contact us at ent.gigkarasek@gigkarasek.at
Read our blog and download the white paper on CO₂ utilization!



We develop ♦ efficient ♦ competent ♦ cooperative ♦ proactive ♦ goal-oriented ♦ reliable customized process solutions and systems according to your requirements.

Regardless of the scope of services, our aim is to optimize your production facilities with tailor-made solutions in terms of product quality and processes. Where other companies reach their limits, we find ways to process your material flows by combining various process steps that have been developed over decades. A high level of expertise and personal all-round service make GIG Karasek your reliable partner for unique challenges.



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