

M C P S E R V E R

N O C O D E

C L O U D H O S T E D

Chlor-Alkali Plant Design Engine.

Run technical specifications for electrolysis plant design.

Chlor-Alkali Plant Design Engine provides the technical math needed to spec out electrolysis facilities. Your AI client uses this MCP to check technology viability, estimate annual production of chlorine and caustic soda, calculate electrical loads, and predict product purity based on specific plant capacities and technology types.

A+ Quality Score 100/100

electrolysis

chlorine

caustic-soda

chemical-engineering

industrial-automation



The connectivity layer between AI and the world's software.

Vinkius sits between AI and every application. All communication passes through Vinkius Cloud via the Model Context Protocol (MCP) — with governance, observability, and security at every layer.

Your AI Connections Run Through Vinkius Cloud

The world's largest
managed MCP catalog

Vinkius is the connectivity layer where AI connects to the software your business already runs. We handle the hosting, the security, the credentials, the uptime — you get agents that actually do things.

We operate the world's largest managed MCP catalog. Major SaaS platforms, CRMs, databases, and cloud providers — running, monitored, production-ready. This MCP server is hosted and maintained by the Vinkius Cloud for AI Agents.

The agent doesn't manage credentials, doesn't manage uptime, doesn't manage security. Vinkius does.

— Architecture principle

Four Pillars of the Vinkius Runtime

01 — Security by design

Credentials stay encrypted at rest via AES-256. The AI agent never touches raw keys — they're injected into a sandboxed V8 isolate at runtime. Actions are logged, and connections have an emergency kill switch.

03 — Deterministic observability

Eight immutable metrics per endpoint: request volume, p95 latency, error rate, active connections, cost attribution. A live payload feed logs every tool call with mutation detection.

02 — Built on MCP Fusion

This MCP server was built with **MCP Fusion**, the open-source framework (Apache 2.0) that powers the entire Vinkius catalog. Schema-as-firewall strips undeclared fields, compiled PII redaction runs at zero overhead, and cryptographic lockfiles produce git-diffable audit trails.

04 — Autonomous operations

Servers are deployed, monitored, and patched autonomously. New capabilities and security patches ship weekly. Zero-downtime deployments ensure continuous availability across all managed MCP servers.

AES-256

Encryption at rest

Ed25519

PKI vault signatures

24h TTL

Ephemeral session keys

V8 Isolate

Sandboxed execution

One Token. Instant Access.

Every MCP server on Vinkius is accessed through a **Connection Token**. Tokens are generated in the cloud dashboard and produce a unique MCP endpoint URL. Paste this URL into any MCP-compatible client — no SDK required.

A single token can serve **multiple AI clients simultaneously**, or you can issue separate tokens per client for granular access control. Each token tracks its own request count, last activity timestamp, and can be individually enabled or revoked.

MCP ENDPOINT`https://edge.vinkius.com/{token}/mcp`

Claude



Cursor



VS Code



Windsurf



Grok



Gemini

Security Is the Architecture

Security in Vinkius is not a feature — it's the foundation of the runtime. The gateway enforces multiple independent protection layers between AI agents and third-party APIs.

01 — Ed25519 PKI Vault

Every workspace has an Ed25519 Master Key. Session keys are generated ephemerally (24h TTL) and signed by the Master Key. Credentials never leave the vault boundary.

02 — V8 Isolate Sandboxing

Tool code runs inside isolated-vm V8 isolates with 64 MB memory caps and per-request timeouts. No filesystem access, no network access except through the SSRF-guarded fetch bridge.

03 — SSRF Guard

All outbound HTTP requests are DNS-resolved and validated before execution. Private IP ranges (10.x, 172.16-31.x, 192.168.x, AWS metadata 169.254.x) are blocked at the network layer.

05 — Cryptographic Audit Trail

Every request is signed into a SHA-256 hash chain with Ed25519 signatures. Events form a tamper-proof, SIEM-exportable forensic record.

04 — DLP & PII Redaction

A ResponseGuard pipeline intercepts every tool response. Configurable redaction patterns strip sensitive fields (emails, SSNs, card numbers) before data reaches the AI agent.

06 — Honeypot Trap System

Phantom credentials are injected into isolated environments. If a honeypot is used outside Vinkius infrastructure, the server is quarantined instantly.

Emergency Kill Switch

EU AI Act Art. 14(1)
Compliant

The kill switch is an **emergency halt** mechanism — not a simple toggle. When triggered, it executes three actions atomically:

01 — Server deactivated

The MCP server is immediately taken offline across the entire cluster.

02 — All tokens revoked

Every connection token is invalidated. Total lockout — reconnection blocked until new tokens are issued.

03 — WebSocket connections killed

Active connections terminated via Redis pubsub broadcast. Propagates to every runtime node in the cluster.

Full Visibility. Zero Guesswork.

The Vinkius cloud dashboard includes a full MCP Governance suite — real-time analytics and security controls for production AI operations.

Control Plane

KPI dashboard with request volume, latency, success rate, token consumption, and AI-generated operational briefings.

FinOps

Cost tracking per tool, payload compression savings, budget optimization signals, and consumption trends.

Firewall & DLP

PII redaction activity, sensitive data protection counters, and security event timeline.

Agent Activity

Which AI clients are connecting, how often, and what they're doing — real-time session tracking.

Tool Health

Slowest and most error-prone tools, with actionable root-cause insights and performance baselines.

Incident Log

Error trends, failure rates, status-code breakdowns, and forensic audit trail access.

Get started at cloud.vinkius.com — connect your AI agent in under 60 seconds.

Chlor-Alkali Plant Design Engine MCP

4 tools available

Cloud-hosted on Vinkius

You can use this MCP to handle the heavy lifting of electrolysis plant modeling. Instead of manually calculating yields or energy draws, you ask your AI client to run the numbers for you. It handles the specific math for chlorine, caustic soda, and hydrogen production based on your chosen capacity. The engine factors in technology-specific efficiencies and modern environmental standards, so you aren't just guessing at feasibility. Whether you are checking if a membrane or diaphragm setup works for a specific region or trying to predict the purity of your caustic soda, this tool provides the technical baseline. It turns your agent into a specialized chemical engineering assistant that understands the relationship between plant capacity, energy consumption, and product output.

Core Capabilities

01 — Yield Estimation

Your agent calculates annual chlorine, caustic soda, and hydrogen outputs.

02 — Energy Modeling

The AI determines total electrical power requirements for specific plant capacities.

03 — Quality Prediction

Your client predicts the purity of caustic soda and chlorine products.

04 — Regulatory Checking

The tool checks if a technology meets regional environmental standards.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/en/ai-agent-connect/chlor-alkali-plant-design-engine — connect your AI agent in three steps.

- 01

Connect your MCP-compatible client like Claude or Cursor to Vinkius.
- 02

Ask your agent to perform a specific calculation, such as estimating energy needs.
- 03

The agent calls the relevant tool from this MCP.
- 04

The tool processes the capacity and technology data.
- 05

Your agent receives the technical results and presents them to you.

Connect your AI client to Vinkius to access these engineering tools instantly.

Built For

This MCP is built for professionals in the chemical and industrial sectors who need rapid technical modeling.

Chemical Engineers

They use the tool to generate technical specifications and yield estimates.

Plant Designers

They rely on it to calculate energy loads and technology feasibility.

Project Managers

They use the output to validate production targets and energy budgets.

What Changes When You Connect

- 01

Calculates annual production yields for multiple products at once.
- 02

Determines electrical power needs based on plant capacity.

- 03

Validates technology viability against regional environmental standards.
- 04

Predicts product purity levels for caustic soda and chlorine.

Real-World Applications

Capacity Planning

Determine how much caustic soda a new plant will produce annually based on its chlorine capacity.

Energy Budgeting

Calculate the total MWh required to operate a diaphragm or membrane plant.

Regulatory Compliance

Check if a proposed electrolysis technology meets the environmental rules of a specific region.

Quality Control Modeling

Predict the purity of output products during the initial design phase.

Patterns to Avoid

Vague capacity requests

❌ AVOID

Asking your agent to 'design a big plant' without specifying capacity or technology type.

✓ INSTEAD

Provide specific capacity targets and use ``calculate_production_yields`` to get exact annual output numbers.

Ignoring regional standards

❌ AVOID

Assuming a membrane setup is viable in a region with strict environmental limits without checking first.

✓ INSTEAD

Run ``get_technology_feasibility`` to confirm if your chosen tech meets local environmental rules.

Manual energy math

❌ AVOID

Trying to manually estimate MWh requirements for a new diaphragm plant using spreadsheets.

✓ INSTEAD

Let your agent handle the load calculations using ``estimate_energy_requirements`` for better accuracy.

The Right Fit

Chemical engineers and plant designers should connect this MCP to automate technical modeling. Project managers looking for quick feasibility checks will find it useful. If you only need general industry trivia rather than specific plant math, you don't need this tool.

4 Tools for Chlor-Alkali Plant Design and Modeling

These tools handle the chemical engineering math for electrolysis plant capacity, energy needs, and product purity.

#	TOOL	DESCRIPTION
01	calculate_production_yields	This tool estimates the annual output for chlorine, caustic soda, and hydrogen based on your plant's capacity.
02	estimate_energy_requirements	Use this to find the total electrical power needed to run the plant at a specific capacity.
03	evaluate_product_quality	This tool predicts the purity levels you can expect for produced caustic soda and chlorine.
04	get_technology_feasibility	This tool determines if a specific technology is viable given a region's environmental standards.

See It in Action

Real prompts you can use once this MCP is connected to your AI agent through Vinkius Cloud.

U Is membrane technology allowed in Europe?



Yes, membrane technology is a compliant and recommended standard for electrolysis in Europe.

U What is the annual caustic soda yield for a 100,000 ton chlorine capacity plant using membrane technology?



A plant with a 100,000 metric ton chlorine capacity using membrane technology will produce 82,000 metric tons of caustic soda.

U How much energy does a 50,000 ton capacity diaphragm plant consume?



A 50,000 metric ton capacity plant using diaphragm technology requires 2,750,000 MWh of total annual energy.

Frequently Asked Questions

01 What can this MCP calculate?

It calculates annual production yields, electrical energy requirements, product purity, and technology feasibility.

02 Which products are included in the yield estimates?

The engine estimates yields for chlorine, caustic soda, and hydrogen.

03 Can I check if a technology is compliant in Europe?

Yes, you can use the feasibility tool to check if a technology like membrane electrolysis is compliant with European standards.

04 How does the energy requirement calculation work?

The tool calculates the total electrical power needed based on the specific capacity and technology type of the plant.

05 Do I need to host this myself?

No, Vinkius hosts and manages the MCP so you can use it immediately after connecting your client.

06 Can I design a plant using mercury technology?

No. The `get\_technology\_feasibility` tool will flag mercury technology as non-compliant in major regions like the USA and Europe due to environmental regulations.

07 How do I estimate the electricity needed for my plant?

You can use the `estimate\_energy\_requirements` tool by providing your planned annual capacity and the chosen electrolysis technology.

08 Which technology provides the highest purity?

Membrane technology typically provides the highest purity. You can verify specific purity levels using `evaluate\_product\_quality` based on your brine purity level.

Go Live in 60 Seconds

Get your connection token from cloud.vinkius.com, then paste the endpoint URL into any MCP-compatible client.

YOUR MCP ENDPOINT

`https://edge.vinkius.com/[TOKEN]/mcp`

CLIENT	WHERE TO CONFIGURE
 Claude AI	Profile → Customize → Connectors → "+" → Add custom connector → Paste endpoint
 Cursor	Settings → Features → MCP Servers → "+ Add New MCP Server" → Type: SSE → Paste endpoint
 VS Code	Ctrl/Cmd+Shift+P → "MCP: Add Server" → add <code>"chlor-alkali-plant-design-engine": { "url": "..." }</code>
 Windsurf	MCP Settings → <code>mcp_settings.json</code> → Add endpoint URL
 ChatGPT	Settings → Tools & plugins → Add MCP server → Paste endpoint
 Gemini	Extensions → Add MCP Server → Paste endpoint URL

ASK AN AI ABOUT THIS

Let your preferred AI explain this MCP server

-  Ask ChatGPT 
-  Ask Claude 
-  Ask Perplexity 
-  Ask Gemini 
-  Ask Grok 

READY TO CONNECT

Chlor-Alkali Plant Design Engine is live on Vinkius Cloud.

Get your connection token, paste it into your AI agent, and
start building. No SDK. No deployment. Just results.

Start at cloud.vinkius.com →

vinkius.com · support@vinkius.com

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DOCUMENT INFORMATION

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Server ID	01a095d6-a6fd-7088-8540-93284f49abc9
Platform	Vinkius Cloud for AI Agents
Endpoint	https://edge.vinkius.com/{token}/mcp

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