

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

Acrylic Acid Plant Designer MCP

Model chemical production from feedstock to final purification.

Acrylic Acid Plant Designer MCP provides a specialized engineering suite for modeling the chemical lifecycle of acrylic acid. Your AI client uses this to calculate reactor specifications, predict byproduct yields, and determine the economic viability of a production facility based on specific feedstock costs and target purity levels.

A+

Quality Score 100/100

chemical-engineering

acrylic-acid

oxidation

reactor-design

process-simulation



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.

Acrylic Acid Plant Designer MCP

4 tools available

Cloud-hosted on Vinkius

You can use this MCP to bridge the gap between chemical engineering models and your AI-driven design workflows. Instead of manually calculating reactor volumes or separation configurations, you let your agent handle the heavy lifting of oxidation kinetics and separation modeling. You can define your raw material inputs and let the agent determine the necessary catalyst types and physical reactor specs. It covers the entire production chain, allowing you to simulate how different feedstock availability affects your final product purity and overall plant profitability. Whether you are looking at the waste generation profile or the configuration of purification units for glacial acid, this tool provides the mathematical backbone for your chemical process simulations.

Core Capabilities

01 — Reactor Modeling

Your agent calculates volume and catalyst requirements based on feedstock.

02 — Purification Planning

The AI determines the necessary separation train for specific product grades.

03 — Waste Prediction

Your agent estimates the mass yield of byproducts during oxidation.

04 — Financial Assessment

The tool checks plant viability against market costs for raw materials.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/en/ai-agent-connect/acrylic-acid-plant-designer — connect your AI agent in three steps.

- 01 Connect your preferred MCP-compatible client to Vinkius.
- 02 Provide your feedstock and target purity requirements to your agent.
- 03 The agent invokes the necessary design and calculation tools.
- 04 Review the generated reactor specs, byproduct profiles, or economic reports.

Get your engineering environment running in minutes.

Built For

This MCP is built for professionals working in chemical process design and industrial engineering.

Chemical Engineers

Use the agent to run rapid iterations on reactor and separation designs.

Process Designers

Hand off complex oxidation kinetics calculations to your AI client.

Plant Managers

Use the economic tools to check the feasibility of new production lines.

What Changes When You Connect

- 01 Connects chemical engineering models directly to your AI agent.
- 02 Automates the calculation of reactor volumes and catalyst selection.
- 03 Provides a clear view of byproduct mass yields during oxidation.

- 04 Determines the necessary purification steps for specific acid grades.
-

Real-World Applications

Capacity Planning

Determine the required reactor size for a specific target production volume.

Purity Optimization

Configure separation units to ensure the final product meets target purity levels.

Economic Feasibility Studies

Run cost-benefit analyses on plant designs using real-time feedstock and product pricing.

Byproduct Management

Predict waste generation to plan for downstream handling and environmental impact.

Patterns to Avoid

Guessing reactor dimensions

❌ AVOID

You tell your agent to just pick a standard reactor size and hope the catalyst works for your feedstock.

✓ INSTEAD

Input your specific raw material specs and use `design_reactor_system` to get precise physical specifications and catalyst types.

Ignoring byproduct mass yields

❌ AVOID

You design a plant based only on the primary product and ignore the waste generated during oxidation.

✓ INSTEAD

Run `estimate_byproduct_profile` to predict the specific types and quantities of byproducts before you finalize your design.

Skipping economic validation

❌ AVOID

You build a full process model without checking if the feedstock costs eat your entire margin.

✓ INSTEAD

Use `evaluate_economic_feasibility` to weigh your feedstock costs against product value to ensure the design is viable.

The Right Fit

Chemical engineers and process designers should connect this MCP to automate complex oxidation math. Plant managers should use it for rapid feasibility checks. If your work doesn't involve modeling chemical production chains or reactor kinetics, this tool won't be useful to you.

Acrylic Acid Plant Designer: 4 Core Engineering Tools

These tools handle the heavy lifting for oxidation kinetics, reactor sizing, and purification configurations.

#	TOOL	DESCRIPTION
01	design_reactor_system	This tool calculates physical reactor specifications and selects the required catalyst type based on your raw material inputs.
02	estimate_byproduct_profile	Use this to predict the specific types and quantities of byproducts generated during the oxidation process.
03	evaluate_economic_feasibility	This tool assesses whether your plant design is financially viable by weighing feedstock costs against product value.
04	calculate_separation_train	This tool determines the exact configuration of purification units needed to reach your target product state.

See It in Action

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

U Design a reactor for 5000 units of capacity with 99% purity and 10000 units of propylene available.



The reactor requires a volume of 450 cubic meters using a Selective Oxidation Tier catalyst, operating at an optimal temperature of 350K.

U What is the byproduct profile for a reactor operating at 380K with 2000 units of propylene?



The process will generate CO₂ and organic acid byproducts with a mass yield of 0.85 per unit of propylene.

U Is it profitable to produce glacial acid if propylene costs 500 per unit and product value is 1200 per unit?



Based on the provided reactor and separation configurations, the plant shows a positive gross margin and a break-even capacity of 1200 units.

Frequently Asked Questions

01 What can this MCP simulate?

It simulates the chemical production of acrylic acid, including reactor design, byproduct generation, and purification requirements.

02 Which AI clients can I use with this MCP?

You can use any MCP-compatible client, such as Claude, Cursor, Windsurf, or VS Code.

03 Can I use this to check if a plant will be profitable?

Yes, the `evaluate_economic_feasibility` tool assesses plant viability based on feedstock costs and product value.

04 Does it handle different types of acid products?

Yes, the separation train tool can be configured to reach specific states like glacial acid or esters.

05 Do I need to host the MCP myself?

No, Vinkius hosts and manages the MCP for you, so it is ready to use immediately after connection.

06 What can I design with this server?

You can design full reactor systems, determine separation train configurations for glacial acid or esters, estimate byproduct profiles, and evaluate the economic feasibility of the entire plant design.

07 How do I calculate the reactor size?

Use the `design_reactor_system` tool by providing the available propylene, your target capacity, and the desired product purity.

08 Can I model ester production?

Yes, by using `calculate_separation_train` and specifying 'ester' as the product type, the tool will include the necessary esterification reactor stages and distillation requirements.

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>"acrylic-acid-plant-designer": { "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

Acrylic Acid Plant Designer 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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Platform	Vinkius Cloud for AI Agents
Endpoint	https://edge.vinkius.com/{token}/mcp

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