

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

Completion Fluid Design MCP

Build stable brine systems that protect your reservoir.

Completion Fluid Design MCP gives your AI client the specialized engineering tools needed to design optimal brine systems. You can calculate brine density, predict salt precipitation, and assess potential formation damage to ensure wellbore stability and minimize corrosion risks during completion operations.

A+ Quality Score 100/100

brine

reservoir

completion

wellbore

fluid-design



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.

Completion Fluid Design MCP

4 tools available

Cloud-hosted on Vinkius

You can now run complex brine chemistry and fluid design calculations directly through your AI client. This MCP provides the specific logic needed to handle the delicate balance of wellbore stability and reservoir protection. Instead of manually checking salt solubility or permeability risks, you let your agent run the math. You can determine the exact brine type and density required for specific reservoir conditions, then immediately check if those fluids will precipitate solids at expected temperatures. If you're worried about the fluid damaging the formation, the MCP assesses permeability threats for you. It also handles the chemical side, identifying the specific additive packages needed to fight corrosion and maintain stability. It's a technical toolkit that turns your AI into a specialized completion engineer.

Core Capabilities

01 — Brine Selection

Your agent picks the right brine type and density for your reservoir.

02 — Precipitation Prediction

The AI checks if salt will crystallize at your operating temperatures.

03 — Damage Assessment

Your client evaluates the risk of the fluid reducing reservoir permeability.

04 — Chemical Specification

The MCP identifies the additives needed to stop corrosion and maintain stability.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/en/ai-agent-connect/completion-fluid-design — connect your AI agent in three steps.

- 01 Connect your preferred MCP-compatible client to Vinkius.
- 02 Provide your reservoir pressure, temperature, and formation data to your agent.
- 03 The agent uses the MCP tools to run density, crystallization, and damage calculations.
- 04 Receive specific brine recommendations and additive requirements in your chat interface.

Connect your AI client to Vinkius and start running engineering calculations immediately.

Built For

This MCP is built for petroleum engineers and completion specialists who need to validate fluid designs quickly.

Completion Engineer

Hands off reservoir data to the AI to generate brine recommendations.

Reservoir Engineer

Uses the tool to check if proposed fluids will damage formation permeability.

Fluid Specialist

Relies on the MCP to verify crystallization risks and additive requirements.

What Changes When You Connect

- 01 Reduces the risk of salt precipitation in the wellbore.
- 02 Protects reservoir permeability from fluid-induced damage.
- 03 Automates the selection of corrosion inhibitors and stabilizers.

- 04** Provides density recommendations based on real reservoir pressure and temperature.
-

Real-World Applications

Wellbore Stability

Ensure the brine density is correct to prevent wellbore collapse.

Risk Mitigation

Check if a specific brine composition will precipitate solids at bottomhole temperatures.

Corrosion Management

Identify the necessary chemical packages to protect tubulars in high-temperature environments.

Formation Protection

Evaluate how different brine types will impact the permeability of the reservoir.

4 Tools Available

#	TOOL	DESCRIPTION
01	check_crystallization_risk	This tool predicts if your chosen brine will precipitate solids at the expected wellbore temperatures.
02	design_additive_package	Use this to identify the specific chemical additives required to manage corrosion and fluid stability.
03	evaluate_formation_damage	This tool assesses how much the brine might damage the permeability of your reservoir.
04	get_brine_recommendation	This tool determines the best brine type and density based on your specific reservoir conditions.

See It in Action

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

U Recommend a brine for a sandstone reservoir with 5000 psi pressure and 150 degrees Fahrenheit.



The recommended brine is Sodium Chloride with a target density of 1.05 g/cm³ to maintain stability in the sandstone formation.

U Will a Calcium Chloride brine precipitate at 40 degrees Fahrenheit?



No, the crystallization temperature for this composition is 32 degrees Fahrenheit, providing a safe margin.

U What additives are needed for a high corrosion risk brine at 200 degrees?



The required additive package includes high-concentration corrosion inhibitors and thermal stabilizers to protect tubulars.

Frequently Asked Questions

01 How do I use this MCP with Claude or Cursor?

You connect once via Vinkius. Once connected, your AI client can immediately call the brine design tools.

02 Can this MCP predict salt precipitation?

Yes, the check_crystallization_risk tool predicts if the brine will precipitate solids at your expected wellbore temperatures.

03 Does it help with corrosion control?

Yes, the `design_additive_package` tool identifies the chemicals needed to manage corrosion and maintain stability.

04 What kind of reservoir data is needed?

You typically need to provide pressure, temperature, and formation type to get accurate brine recommendations.

05 Is the brine density calculated automatically?

Yes, the `get_brine_recommendation` tool determines the optimal density based on the conditions you provide.

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>"completion-fluid-design": { "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

Completion Fluid Design 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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