MCP SERVER | NO CODE | CLOUD HOSTED

Asphaltene Deposition Model MCP

Predict fluid instability and manage deposition risks in real time.

Asphaltene Deposition Model MCP provides thermodynamic modeling to predict how asphaltenes precipitate and deposit in reservoirs and wellbores. Your AI client uses this tool to analyze fluid stability, map out high-risk deposition zones, and calculate accumulation rates based on specific flow conditions.

A+ Quality Score 100/100

asphaltene | reservoir-engineering | fluid-dynamics | petroleum | deposition-modeling

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vinkius.com/en/ai-agent-connect/asphaltene-deposition-model

SCAN TO VIEW

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.

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.

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.

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	Ed25519	24h TTL	V8 Isolate
Encryption at rest	PKI vault signatures	Ephemeral session keys	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.

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.

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.

06 — Honeytoken Trap System

Phantom credentials are injected into isolated environments. If a honeytoken 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.

Agent Activity

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

FinOps

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

Tool Health

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

Firewall & DLP

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

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.

Asphaltene Deposition Model MCP

4 tools available
Cloud-hosted on Vinkius

You can now bring advanced thermodynamic modeling directly into your AI-driven engineering workflows. This MCP gives your agent the ability to handle complex asphaltene instability calculations that used to require manual simulation runs. Instead of jumping between different software packages, you can ask your AI client to analyze a specific fluid composition or map out where deposition is likely to occur along a pressure and temperature path.

It works by calculating how solids accumulate on surfaces and identifying the exact physical or operational locations where precipitation risks are highest. You can use it to estimate deposition rates for specific pipe materials or flow velocities, making it easier to plan maintenance. When risks are identified, the MCP helps you generate actionable mitigation strategies to prevent or remediate buildup. It turns raw fluid data into a clear picture of reservoir and wellbore health, helping you manage production risks before they cause hardware issues.

Core Capabilities

01 — Stability Analysis

Your agent checks if fluid compositions will remain stable under specific pressure and temperature profiles.

02 — Risk Mapping

The AI identifies specific zones in the wellbore or reservoir where precipitation is likely.

03 — Rate Estimation

Your client calculates the speed of solid accumulation based on flow conditions and surface types.

04 — Mitigation Planning

The tool generates strategies to manage or prevent deposition risks.

One Click on Vinkius — From Prompt to Execution

Available at **vinkius.com/en/ai-agent-connect/asphaltene-deposition-model** — connect your AI agent in three steps.

01 Connect your AI client to the Vinkius hosted MCP.

02 Provide fluid composition and pressure/temperature data to your agent.

03 The agent calls the specific tool needed for stability, mapping, or rate calculation.

04 Review the calculated deposition zones or mitigation plans provided by the AI.

Get the MCP running in your AI client and start modeling fluid behavior immediately.

Built For

This MCP is built for petroleum engineers and reservoir specialists who need to model fluid behavior within their AI workflows.

Reservoir Engineer

Uses the MCP to model fluid stability and predict deposition risks in the reservoir.

Production Engineer

Hands off flow data to the AI to calculate deposition rates and plan mitigation.

Fluid Specialist

Uses the tool to analyze how specific fluid compositions react to pressure changes.

What Changes When You Connect

01 Connects thermodynamic modeling directly to your AI client.

02 Identifies high-risk deposition zones along pressure and temperature paths.

03	Provides specific mass accumulation rates for different materials and velocities.
04	Generates actionable mitigation plans for deposition management.

Real-World Applications

Wellbore Risk Assessment

Identify exactly where pressure drops will trigger asphaltene precipitation in a wellbore.

Fluid Stability Testing

Check if a new oil composition will remain stable under reservoir conditions.

Maintenance Planning

Calculate deposition rates to schedule cleaning or chemical treatments before blockages occur.

Mitigation Strategy Development

Create a plan to manage deposition risks based on predicted instability profiles.

4 Tools Available

#	TOOL	DESCRIPTION
01	analyze_stability_profile	This tool determines if a specific fluid composition remains stable under your current pressure and temperature conditions.
02	calculate_deposition_rate	Use this to estimate how fast asphaltene solids will accumulate on surfaces like pipes or wellbore walls.
03	map_deposition_zones	This tool identifies the specific physical or operational locations where asphaltene precipitation is most likely to happen.
04	suggest_mitigation_plan	This tool provides actionable strategies to prevent or fix deposition issues in your production environment.

See It in Action

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

U Is this oil composition stable at 3000 psi and 150 degrees Fahrenheit?

The fluid is stable with a stability margin of 450 psi.

U Where is the deposition risk highest along this pressure path?

The highest risk zone is located at a depth of 5000 feet where pressure drops below 2500 psi.

U What is the expected deposition rate for a steel pipe at this flow velocity?

The predicted mass accumulation rate is 0.05 kg/m² per day.

Frequently Asked Questions

01 **What can this MCP do for reservoir modeling?**

It predicts asphaltene precipitation and deposition in reservoirs and wellbores using thermodynamic modeling.

02 **Which AI clients can use this MCP?**

You can use this MCP with any compatible client like Claude, Cursor, Windsurf, or VS Code.

03 **How does the MCP help with deposition mitigation?**

The tool can suggest actionable strategies to prevent or remediate deposition once risks are identified.

04 **Can I calculate how fast solids will build up?**

Yes, the calculate_deposition_rate tool estimates the speed at which asphaltene solids accumulate on surfaces.

05 **Do I need to host the MCP myself?**

No, Vinkius hosts and manages the MCP for you, so it is ready to use once you connect your client.

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 `"asphaltene-deposition-model": { "url": "…" }`
Windsurf	MCP Settings → `mcp_settings.json` → 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

Asphaltene Deposition Model 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

INDEPENDENT PLATFORM DISCLAIMER

DOCUMENT INFORMATION

Generated	September 2026
MCP Server	Asphaltene Deposition Model MCP
Server ID	`01a09b2c-853b-706c-9f8c-4e63e2c8aabc`
Platform	Vinkius Cloud for AI Agents
Endpoint	`https://edge.vinkius.com/{token}/mcp`

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