MCP SERVER | NO CODE | CLOUD HOSTED

Formation Damage Assessment MCP

Quantify wellbore damage and predict productivity gains.

Formation Damage Assessment MCP gives your AI client the specialized math needed for reservoir engineering. It calculates skin factors from pressure data, predicts how chemical fluids might damage a well, and quantifies permeability loss due to physical blockages. You can also forecast how much production you'll actually gain after running remedial treatments.

A+ Quality Score 100/100

reservoir | petroleum | skin-factor | permeability | drilling

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vinkius.com/en/ai-agent-connect/formation-damage-assessment

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.

Formation Damage Assessment MCP

4 tools available
Cloud-hosted on Vinkius

You can use this MCP to handle the heavy lifting of reservoir damage calculations directly within your AI client. Instead of manually running formulas, you provide your agent with pressure, flow, and permeability data to get immediate results. It handles the math for determining skin factors and assessing how much permeability is lost when fines migrate or fluids invade the formation. If you are planning a workover, you can use it to model how much productivity you'll actually see after a stimulation treatment. It also helps you avoid mistakes by predicting if specific chemicals will cause damage through filtrate invasion. This turns your agent into a specialized engineering assistant that understands the relationship between wellbore damage and reservoir flow capacity.

Core Capabilities

01 — Skin Factor Analysis

Your agent uses this to determine wellbore damage from pressure and flow measurements.

02 — Fluid Compatibility Checks

Your agent uses this to predict if chemical treatments will cause further damage.

03 — Permeability Loss Calculation

Your agent uses this to quantify how much physical blockage is reducing flow.

04 — Productivity Forecasting

Your agent uses this to estimate the benefits of planned stimulation treatments.

One Click on Vinkius — From Prompt to Execution

Available at **vinkius.com/en/ai-agent-connect/formation-damage-assessment** — connect your AI agent in three steps.

01 Connect your preferred MCP-compatible client to Vinkius.

02 Provide your reservoir data, such as pressure, flow rate, or permeability, to your agent.

03 The agent calls the specific tool needed for your calculation.

04 The MCP returns the calculated skin factor, permeability loss, or productivity gain.

05 You use these results to make engineering decisions or update your models.

You connect the MCP to your AI client and start running engineering calculations immediately.

Built For

This MCP is built for petroleum engineers and reservoir specialists who need to run rapid damage assessments.

Reservoir Engineer

Hands off pressure and flow data to the agent to get quick skin factor and permeability loss results.

Production Engineer

Uses the tool to model the expected output of well stimulation and remedial work.

Drilling Engineer

Checks fluid compatibility to prevent damage during drilling or completion phases.

What Changes When You Connect

01 Calculates skin factors directly from raw pressure and flow data.

02 Predicts productivity gains from remedial treatments before you spend the money.

03	Identifies chemical damage risks from filtrate invasion.
04	Quantifies the impact of physical blockages on reservoir capacity.

Real-World Applications

Stimulation Planning

Model the expected increase in flow rate to justify the cost of a well stimulation job.

Damage Assessment

Determine the skin factor and damage radius using recent well test data.

Fluid Selection

Check if a specific chemical fluid is compatible with the formation to avoid invasion damage.

Permeability Monitoring

Calculate how much permeability has been lost due to fines migration or physical blockage.

4 Tools Available

#	TOOL	DESCRIPTION
01	analyze_skin_factor	This tool calculates the extent of wellbore damage. It uses your provided pressure and flow data to determine the skin factor.
02	estimate_stimulation_gain	This tool forecasts productivity increases. It predicts the expected improvement in flow after you perform remedial well treatments.
03	evaluate_fluid_compatibility	This tool predicts chemical risks. It assesses the likelihood and severity of damage caused by fluid interactions and filtrate invasion.
04	quantify_permeability_loss	This tool measures physical blockage. It calculates how much reservoir flow capacity is lost due to various damage mechanisms.

See It in Action

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

U Calculate the skin factor for a well with 100 mD permeability, 5m wellbore radius, and this well test data: {"pressureDrawdown": 50, "flowingRate": 200, "reservoirPressure": 3000}

The calculated skin factor is 2.5 and the damage radius is 1.2 meters.

U What is the expected productivity increase if I reduce the skin from 5 to 0 with a current flow rate of 500 bpd?

The expected flow rate after stimulation is 1250 bpd, representing a 150% productivity improvement.

U How much permeability is lost if the initial permeability is 200 mD, invasion depth is 2m, and fines migration factor is 0.5?

The permeability reduction ratio is 0.4, resulting in an impaired zone permeability of 80 mD.

Frequently Asked Questions

01 **What kind of data do I need for skin factor analysis?**

You need pressure drawdown, flowing rate, and reservoir pressure to use the analyze_skin_factor tool.

02 **Can this MCP help with stimulation planning?**

Yes, you can use the estimate_stimulation_gain tool to forecast productivity increases after remedial treatments.

03 How does it handle chemical damage?

The evaluate_fluid_compatibility tool predicts the likelihood and severity of damage caused by chemical interactions.

04 Which AI clients can use this MCP?

You can use this with any MCP-compatible client, including Claude, Cursor, Windsurf, and VS Code.

05 Does it calculate permeability loss?

Yes, the quantify_permeability_loss tool calculates the impact of physical blockage on reservoir flow capacity.

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 `"formation-damage-assessment": { "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

Formation Damage Assessment 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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Platform	Vinkius Cloud for AI Agents
Endpoint	`https://edge.vinkius.com/{token}/mcp`

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