

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

Coiled Tubing Force Model MCP.

Get precise mechanical and hydraulic data for wellbore operations.

Coiled Tubing Force Model MCP handles the heavy lifting for engineering calculations during coiled tubing (CT) operations. Your AI client uses this tool to solve for axial forces, check for buckling risks, and determine circulation pressures or weight on bit. It turns complex wellbore geometry and fluid data into actionable mechanical profiles.

A+ Quality Score 100/100

coiled-tubing

mechanical-loads

buckling

hydraulics

wellbore



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.

Coiled Tubing Force Model MCP

4 tools available

Cloud-hosted on Vinkius

You can use this MCP to run specialized engineering math for coiled tubing operations without manual calculation. Instead of solving complex equations for axial loads or hydraulic profiles yourself, you give the parameters to your AI client and let it handle the math. It calculates the tension and compression acting along the tubing length, checks if your setup is at risk of buckling, and determines the pressures needed for fluid circulation. You can also find out the exact net force being applied at the bottom of the hole. This is built for engineers who need to verify structural stability and hydraulic performance in real time while managing wellbore operations.

Core Capabilities

01 — Axial Force Analysis

Your agent calculates tension and compression along the entire tubing string.

02 — Stability Verification

The AI checks for buckling risks based on current axial forces.

03 — Hydraulic Modeling

Your client determines the pressures needed for fluid circulation.

04 — Bottom Hole Force Calculation

The tool finds the net force applied to the tool at the bottom of the well.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/en/ai-agent-connect/coiled-tubing-force-model — connect your AI agent in three steps.

- 01
- Connect your preferred MCP-compatible client to Vinkius.
- 02
- Provide the tubing dimensions and wellbore geometry to your AI agent.
- 03
- Ask the agent to run a specific calculation like buckling or hydraulic profiles.
- 04
- The agent executes the tool and returns the mechanical or hydraulic results.

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

Built For

This MCP is designed for petroleum engineers and field technicians managing coiled tubing assets.

Coiled Tubing Engineer

Uses the tool to verify mechanical loads and stability during well intervention.

Field Technician

Checks real time weight on bit and buckling status during operations.

Wellbore Analyst

Runs hydraulic profiles to manage fluid circulation pressures.

What Changes When You Connect

- 01
- Reduces manual calculation errors in mechanical load modeling.
- 02
- Provides instant buckling stability checks during tripping operations.
- 03
- Calculates hydraulic profiles for fluid circulation requirements.

04 Determines net force at the bottom of the hole automatically.

Real-World Applications

Tripping In Operations

Calculate mechanical loads and axial forces as the tubing enters the wellbore.

Fluid Management

Determine the necessary pressures for circulation using hydraulic profiles.

Stability Monitoring

Check if the current axial force puts the tubing at risk of buckling.

Tool Force Verification

Find the final net force applied to the tool at the bottom of the hole.

4 Tools Available

#	TOOL	DESCRIPTION
01	calculate_hydraulic_profile	This tool determines the specific pressures required to maintain fluid circulation.
02	calculate_mechanical_loads	Use this to find the axial forces, including tension and compression, along the length of the tubing.
03	calculate_weight_on_bit	This tool calculates the final net force applied to the tool at the bottom of the hole.
04	check_buckling_stability	This tool evaluates whether the coiled tubing is at risk of losing structural stability.

See It in Action

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

U What is the weight on bit if the effective weight is 5000, axial force is 1000, and the tubing is buckled?



The weight on bit is 1000 with a significantly reduced weight transfer efficiency due to the buckled state.

U Calculate the mechanical loads for a tripping in operation with specific CT dimensions and wellbore geometry.



The axial force is 4500, with a tension of 4500 and an effective weight of 4500.

U Check if the tubing will buckle with an axial force of 2000.



The tubing is stable with a safety factor of 1.5 and no buckling detected.

Frequently Asked Questions

01 What can this MCP calculate?

It calculates axial mechanical loads, buckling stability, hydraulic circulation pressures, and weight on bit.

02 Which AI clients can use this MCP?

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

03 Does this MCP handle buckling analysis?

Yes, it includes a tool specifically to check if the coiled tubing is at risk of losing structural stability.

04 How does it determine weight on bit?

It calculates the final net force being applied to the tool at the bottom of the hole.

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.

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>"coiled-tubing-force-model": { "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

Coiled Tubing Force 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

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DOCUMENT INFORMATION

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Server ID	01a086dc-d3ad-729b-9045-fcb2a47eae50
Platform	Vinkius Cloud for AI Agents
Endpoint	<code>https://edge.vinkius.com/{token}/mcp</code>

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