

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

Blasting Pattern Design Engine MCP

Calculate precise blast layouts and safety constraints instantly.

Blasting Pattern Design Engine MCP gives your AI agent the engineering math needed for open-pit and underground mining. It handles the heavy lifting for burden, spacing, hole depth, and explosive loading. You can run vibration and flyrock risk assessments to keep operations within site limits without manual calculation errors.

A+ Quality Score 100/100

mining

explosives

blast-design

safety

geotechnical



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.

Blasting Pattern Design Engine MCP

4 tools available

Cloud-hosted on Vinkius

You can now bring specialized mining engineering logic directly into your AI client. This MCP handles the complex geometry and physics required for designing blast patterns in both open-pit and underground environments. Instead of manually calculating hole layouts or checking explosive compatibility, you simply provide the rock properties and bench dimensions to your agent.

It manages the math for burden, spacing, and hole depth while also calculating how much explosive you need for a specific hole. Beyond just layout, the MCP helps you stay compliant with site safety rules. It checks your designs against vibration limits and flyrock risks to ensure your detonation sequences don't exceed established safety thresholds. It's a technical extension for your agent that turns raw site data into actionable blast designs.

Core Capabilities

01 — Pattern Geometry

Your agent calculates hole layouts based on bench height and diameter.

02 — Explosive Loading

The MCP determines the exact amount of explosive needed per hole.

03 — Safety Validation

It checks designs against vibration and flyrock constraints.

04 — Rock Suitability

The tool evaluates if an explosive type is right for the rock type.

05 — Timing Sequences

It generates the detonation order for the blast pattern.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/en/ai-agent-connect/blasting-pattern-design-engine — connect your AI agent in three steps.

- 01 Connect your AI client to the MCP via Vinkius.
- 02 Provide rock properties and bench dimensions to your agent.
- 03 The agent uses the MCP tools to run the engineering math.
- 04 Review the calculated geometry, loading, and safety results.

You connect the MCP to your AI client and start feeding it site parameters.

Built For

This MCP is built for mining professionals who need to move from site data to blast designs quickly.

Mining Engineers

They use the MCP to generate technical blast patterns and verify safety compliance.

Blasting Technicians

They use the tool to double check loading requirements and timing sequences.

Geotechnical Engineers

They use the rock suitability and safety tools to ensure explosive compatibility.

What Changes When You Connect

- 01 Reduces manual calculation errors in pattern geometry.
- 02 Automates the checking of vibration and flyrock safety limits.
- 03 Connects rock properties directly to explosive selection.

04 Provides instant detonation timing sequences.

Real-World Applications

Open-Pit Design

Calculate burden and spacing for large scale bench blasting.

Explosive Management

Determine the exact weight of explosives needed for a specific hole diameter and depth.

Safety Compliance

Verify that a proposed charge weight won't exceed vibration limits near structures.

Rock Analysis

Match explosive types to specific geotechnical rock properties.

4 Tools Available

#	TOOL	DESCRIPTION
01	analyze_rock_suitability	This tool checks if your chosen explosive type matches the specific rock properties of your site.
02	calculate_pattern_geometry	Use this to determine the exact spatial layout of your blast holes.
03	compute_loading_and_timing	This tool calculates the required explosive weight and the detonation sequence for your pattern.
04	validate_safety_constraints	This tool runs your design against vibration limits and flyrock risk models to ensure site safety.

See It in Action

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

- U** Calculate the blast pattern geometry for a 10m bench height with a 3m burden and 4m spacing using a 102mm hole diameter.



The calculated pattern includes a burden of 3.0m, spacing of 4.0m, and a hole depth of 10.0m.

- U** Is a charge weight of 50kg per delay safe for a structure 200m away with a vibration limit of 10mm/s and a 3m burden?



Yes, the design is safe with a predicted vibration of 4.2mm/s and a Low flyrock risk.

- U** Determine the explosive loading for a 12m hole with 102mm diameter, 0.85g/cm³ explosive density, and 3m stemming.



The total charge weight is 76.5kg with a timing sequence of [0, 25, 50, 75].

Frequently Asked Questions

01 What kind of mining can this MCP design for?

It is designed for both open-pit and underground mining operations.

02 How does it handle safety?

The MCP includes a tool to validate designs against vibration limits and flyrock risks to ensure they meet site constraints.

03 Can I use this with any AI client?

Yes, it works with any MCP-compatible client like Claude, Cursor, or Windsurf.

04 Does it calculate explosive amounts?

Yes, it can compute the specific explosive loading required based on hole diameter, depth, and density.

05 Do I need to host the MCP myself?

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

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>"blasting-pattern-design-engine": { "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

Blasting Pattern Design Engine 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

Vinkius is an independent platform and is not affiliated with, endorsed by, sponsored by, verified by, or otherwise authorized by Blasting Pattern Design Engine. All third-party trademarks, logos, and brand names are the property of their respective owners. Their use in this document is strictly for informational purposes to identify service compatibility and interoperability.

DOCUMENT INFORMATION

Generated	September 2026
MCP Server	Blasting Pattern Design Engine MCP
Server ID	01a07f4f-09c4-7080-bf09-602421da48a6
Platform	Vinkius Cloud for AI Agents
Endpoint	https://edge.vinkius.com/{token}/mcp

LICENSE & USAGE

This document is generated automatically by the Vinkius PDF Engine. Content reflects the MCP server configuration at the time of generation and may change as updates are deployed. For the most current information, visit vinkius.com/en/ai-agent-connect/blasting-pattern-design-engine.