

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

BTX Extraction Designer MCP

Build precise aromatic extraction models in seconds.

BTX Extraction Designer MCP handles the heavy lifting for Benzene, Toluene, and Xylene separation. It gives your AI client the ability to evaluate feedstock, pick the right solvents, size extraction columns, and predict how much product you'll actually recover from a given stream.

A+ Quality Score 100/100

btx

extraction

aromatics

solvent-selection

refinery



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.

BTX Extraction Designer MCP

4 tools available

Cloud-hosted on Vinkius

You can now run complex aromatic separation calculations directly through your AI client. This MCP gives your agent the specific chemical engineering logic needed to design BTX extraction processes. Instead of manually checking solubility data or sizing columns in separate spreadsheets, you can ask your agent to run the numbers for you.

You start by checking if your feedstock is even worth processing. Once you know the composition is right, you can move on to selecting the best solvent for the job. The MCP handles the math for physical equipment, giving you the dimensions for columns or mixer-settlers based on your flow rates. Finally, you get a clear picture of your expected purity and recovery rates. It turns your AI client into a specialized process design assistant that understands liquid-liquid extraction and extractive distillation logic.

Core Capabilities

01 — Feedstock Assessment

Your agent uses this to determine if a specific composition is compatible with extraction.

02 — Solvent Selection

The AI identifies the most effective chemical candidate for your specific separation goals.

03 — Equipment Sizing

Your agent calculates the physical dimensions and capacity for extraction columns or mixer-settlers.

04 — Yield Prediction

The AI calculates expected purity and recovery percentages for the final product.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/en/ai-agent-connect/btx-extraction-designer — connect your AI agent in three steps.

- 01 Connect your AI client to the Vinkius hosted MCP.
- 02 Provide feedstock or solvent requirements to your agent.
- 03 The agent calls the specific tool to run the math.
- 04 Receive technical dimensions, solvent recommendations, or yield predictions.

Connect the MCP to your AI client and start running chemical engineering calculations through natural language.

Built For

This MCP is built for engineers working in refinery and petrochemical process design.

Process Engineers

They use the MCP to quickly iterate on extraction unit designs and equipment specs.

Chemical Engineers

They hand off feedstock data to the agent to validate separation feasibility.

Refinery Designers

They use the tool to size extraction columns and predict product yields.

What Changes When You Connect

- 01 Reduces manual calculation time for column sizing and capacity.
- 02 Provides data-driven solvent selection based on feedstock type.
- 03 Connects process design logic directly to your existing AI workflow.

04 Predicts recovery performance before you commit to a design.

Real-World Applications

Initial Feasibility Studies

Check if a new feedstock stream can be processed using standard LLE methods.

Solvent Optimization

Compare different solvent candidates to find the best selectivity for benzene extraction.

Equipment Specification

Generate the required height and diameter for an extraction column based on flow rates.

Yield Forecasting

Estimate the final purity of aromatics to ensure they meet product specifications.

Patterns to Avoid

Guessing equipment sizes

❌ AVOID

You tell your agent to just estimate a column diameter based on a hunch about the flow rate.

✓ INSTEAD

Use ``design_extractor_dimensions`` to get precise physical dimensions and capacity based on your actual flow rates.

Ignoring feedstock compatibility

❌ AVOID

You jump straight into solvent selection without checking if the feedstock can even be processed.

✓ INSTEAD

Always run ``analyze_feedstock_suitability`` first to identify separation hurdles and confirm the composition works.

Manual yield estimation

❌ AVOID

You try to calculate purity and recovery percentages using a separate spreadsheet and then paste the results into your chat.

✓ INSTEAD

Let the agent handle the math directly with ``calculate_recovery_performance`` for accurate product predictions.

The Right Fit

Process and chemical engineers in refinery design should connect this MCP to automate separation math. If you are doing general chemical modeling that doesn't involve BTX or liquid-liquid extraction, this isn't for you. The decision depends on whether you need to bridge the gap between feedstock data and physical equipment specs within your AI workflow.

BTX Extraction Designer: 4 Engineering Tools

These tools handle the heavy lifting for liquid-liquid extraction and extractive distillation math. Your agent uses them to move from feedstock analysis to full equipment sizing.

#	TOOL	DESCRIPTION
01	analyze_feedstock_suitability	This tool checks if your feedstock composition works with standard extraction methods. It also identifies the main separation hurdles you'll face.
02	calculate_recovery_performance	Get your final numbers here. It predicts the specific purity and recovery percentage for your target product.
03	design_extractor_dimensions	This tool calculates the physical size and capacity for your extraction unit. It works for both columns and mixer-settlers.
04	select_optimal_solvent	Use this to find the best solvent candidate. It picks the right option based on your feedstock and the separation performance you need.

See It in Action

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

U Is my feedstock suitable for extraction?



The feedstock has an aromatic fraction of 0.4 and a non-aromatic concentration of 0.6, making it suitable for Liquid-Liquid Extraction (LLE) with medium process intensity.

U What is the best solvent for benzene extraction with a selectivity of 15?



The recommended solvent is Sulfolane, which provides an estimated selectivity of 18.5 and high capacity for benzene.

U Calculate the column diameter for a 100 m³/h feed using Sulfolane.



The calculated column diameter is 2.4 meters with a height of 12.5 meters for the specified flow rate and solvent ratio.

Frequently Asked Questions

01 What kind of extraction processes does this MCP support?

It supports liquid-liquid extraction and extractive distillation logic for BTX processes.

02 Can I use this to size a mixer-settler?

Yes, the `design_extractor_dimensions` tool calculates the size and capacity for both columns and mixer-settlers.

03 How does the solvent selection work?

The `select_optimal_solvent` tool identifies the best chemical candidate by looking at your feedstock type and desired separation performance.

04 Which AI clients can I use with this?

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

05 Do I need to host the MCP myself?

No, Vinkius hosts and manages the MCP for you. You just connect your client and start working.

06 What is the difference between LLE and ED?

Liquid-Liquid Extraction (LLE) uses solubility differences to separate aromatics, while Extractive Distillation (ED) uses a solvent to alter relative volatility in a distillation column.

07 How do I determine the equipment size?

You can use the `design_extractor_dimensions` tool by providing the selected solvent name, feed flow rate, and solvent-to-feed ratio.

08 Can I predict product purity?

Yes, the `calculate_recovery_performance` tool predicts aromatic recovery, product purity, and raffinate purity based on your design parameters.

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>"btx-extraction-designer": { "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

BTX Extraction Designer 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

Generated	September 2026
MCP Server	BTX Extraction Designer MCP
Server ID	01a0952a-fbbc-70a7-a6b2-c508955bd0df
Platform	Vinkius Cloud for AI Agents
Endpoint	https://edge.vinkius.com/{token}/mcp

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