GPUpartner

VALIDATION REPORT · TEXT GENERATION

Gemma 4 31B

on Arc B580 · 4-bit (Q4_K_M) · Ollama / LM Studio · Chat

STATUS · NOV 22, 2026

Not validated

0 of 2 checks pass

Gemma 4 31B at 4-bit needs 19.9 GB; the Arc B580 can use 12.0 GB. The smallest machine we checked that runs it is the RTX 4090.

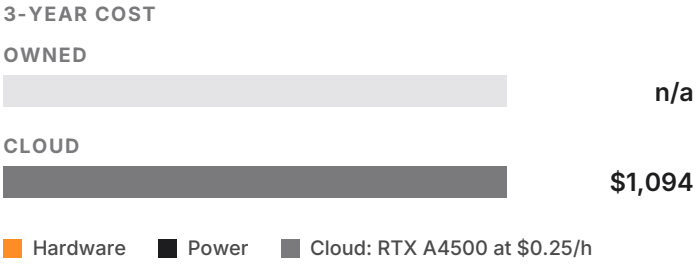
VALIDATION

CHECK	TARGET	RESULT	STATUS
Fits in GPU memory	12.0 GB usable	19.9 GB needed	FAIL
Headroom	5% free	none	FAIL
Context for chat	16K or more	–	NOT TESTED
Writing speed	15 tok/s or more	–	NOT TESTED
First reply	under 3 s, 2K prompt	–	NOT TESTED

Targets: a reply you can read along with, a first reply the use case tolerates, and 5% of memory left free. Calculated from published specs, not benchmarked.

BUDGET

HARDWARE, ONE-TIME	MSRP not entered
POWER, PER YEAR	Doesn't run on this machine
CLOUD INSTEAD, PER YEAR	$365
3-YEAR TOTAL, OWNED	n/a
3-YEAR TOTAL, CLOUD	$1,094
BREAK-EVEN	n/a



Budget basis: 4 h a day, power at $0.18 per kWh, cloud at RunPod on-demand prices as of Nov 22, 2026. Hardware at the MSRP entered in the calculator, not a GPU Partner quote. A 3-year view; resale value, staff time and taxes aren't counted.

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TECHNICAL DETAIL · TEXT GENERATION

Gemma 4 31B

on Arc B580 · 4-bit (Q4_K_M) · Ollama / LM Studio · Chat

SETUP

PARAMETERS	31.3B
PRECISION	4-bit (Q4_K_M)
CONTEXT	8K, auto
CHATS AT ONCE	1
USE	Chat
RUNS IN	Ollama / LM Studio
HARDWARE	Arc B580
GPU CAN USE	12.0 GB of 12.0 GB

MEMORY

WEIGHTS	17.7 GB
CONTEXT	1.1 GB
RUNTIME	1.1 GB
SYSTEM	0.0 GB
OVER BY	7.9 GB

SUGGESTED CHANGES

2× ARC B580	Fits across the cards, 60K context
SPILL TO RAM	Runs, slower, 4.6 tok/s
RTX 4090	Runs it with 80K context
M5 MAX · 36 GB	Runs it with 88K context

SAME MODEL, OTHER MACHINES

RTX 4090	4-bit · 35 tok/s
RTX 5090	6-bit · 45 tok/s
RTX PRO 6000 BLACKWELL	8-bit · 35 tok/s
M5 MAX 128 GB	8-bit · 13 tok/s
M3 ULTRA 256 GB	8-bit · 15 tok/s
DGX SPARK 128 GB	8-bit · 5.7 tok/s
RYZEN AI MAX+ 395 128 GB	8-bit · 4.6 tok/s

HOW TO RUN IT

OLLAMA	`ollama run gemma4:31b`
LLAMA.CPP	`llama-server -hf unsloth/gemma-4-31B-it-GGUF`
VLLM	`vllm serve google/gemma-4-31B-it`
MLX (MAC)	`mlx_lm.chat --model mlx-community/gemma-4-31b-it-4bit`
MODEL CARD	huggingface.co/google/gemma-4-31B-it

METHOD AND ASSUMPTIONS

Memory is the weights (parameters times bits per weight, read from each model's config.json), the context cache for every chat, and the runtime, against the memory this GPU can use after the OS and display take theirs. Writing speed is memory bandwidth over the bytes read per token, plus a per-layer latency, calibrated against llama.cpp benchmarks. First reply is the prompt's FLOPs over the chip's dense 16-bit TFLOPS at the runtime's measured efficiency. Running cost is power at the wall at your rate and hours; the cloud figure is the cheapest RunPod on-demand GPU that runs the same job. Accuracy: memory lands within about a gigabyte; speeds and times are rough, about ±25%. Model data and hardware specs checked Nov 2026; cloud prices are RunPod's on-demand list as of Nov 22, 2026. Report VR-15SF4E0, generated November 22, 2026.