

VANGUARDFX

Vanguard Fire

GPU fire, smoke and explosions for 3ds Max — live in the viewport, VDB out.

User guide · version 1.1.3 · 3ds Max 2024–2027

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1 Getting started

Install

1. Close every running 3ds Max — a running Max keeps the plugin file locked.
2. Run `VanguardFire_Setup_1.1.3.exe` from your account page and tick the Max versions you use (2024, 2025, 2026, 2027).
3. Start Max. Vanguard Fire is in **Create › Geometry › VanguardFX › VanguardFire**. Click-drag the footprint of the box in a viewport, then move the mouse up for the height.

The installer also puts this guide and six sample scenes in `Program Files\VanguardFX\Fire\Samples`: Campfire, Flamethrower, Spreading fire, Fire text, Ground explosion and Smoke tornado.

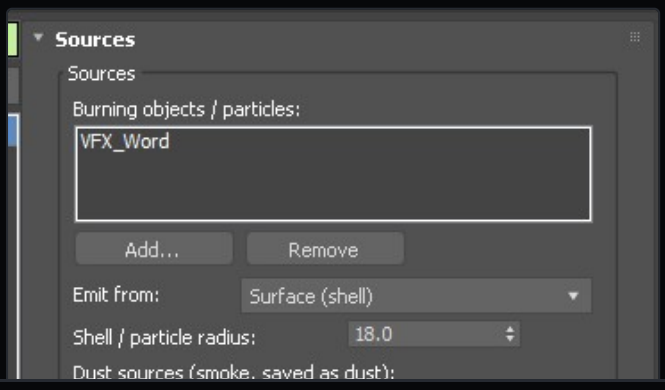
Activate

1. Select the domain and open the **Vanguard Fire – Licence** rollout in the Modify panel.
2. Press **Copy** next to *Your Hardware ID* and send it with your order (or paste it on your account page under **Get a licence**).
3. You receive a licence file. Press **Load file…** (or paste its text into the box) and press **APPLY LICENCE**. The rollout turns to *Licensed: full resolution, VDB export*.

> **Without a licence** everything works on a small grid (64 cells on the longest side) so you can try the tool. SIMULATE above 64 cells, VDB export and the preview renderer need a licence.

2 Your first fire in 5 steps

1. **Make something to burn.** A sphere, a log, a text — any mesh. Put it on the ground.
2. **Create the domain around it** (Create › Geometry › VanguardFX). Make it about 2× wider than the object and 3× taller.
3. **Sources › Add…** and pick your object. Or choose **Campfire** in the Preset list of the Simulate rollout and press **Apply**.
4. **Press Play.** With Live on *Follow the timeline* the fire grows in the viewport. Change any value: Live restarts and shows it at once.
5. **SIMULATE (full quality, every output).** Runs at full resolution and writes the cache, VDB and preview PNGs you ticked in Outputs.





3 Every control explained

Select the domain and open the **Modify** panel. Rollouts top to bottom: **Domain**, **Sources**, **Combustion**, **Smoke & Air**, **Live**, **Fire Look**, **Simulation & Cache**, **Outputs**, **Fluid & Water**, **Viewport & Export**, then the **Simulate** tools and the **Licence**. Every number can be animated (Auto Key) — animating *Fuel per second* is how a fire lights up and dies down.



The real panel (Fire text sample).

Simulate rollout (buttons)

Button	What it does
Preset + Apply	Loads one of the built-in looks (Candle … Ground explosion), including the box size. Ground explosion also builds its own sources.
Save mine	Saves the current settings as your preset (`Documents\VanguardFire\presets`); it appears as *[my] name*.
Restart	Restarts the Live simulation from the first frame.
SIMULATE	The full-quality run: cache + every output ticked in Outputs. Esc stops it.
Clear cache	Deletes this domain's cache files.
Export VDB / Preview render	Write VDB or PNG from an existing cache without simulating again.
Open output folder	Opens the folder with your VDB / PNG.

Vanguard Fire - Domain

Control / range	Default	What it does, when to change it
SIZE		
Width (X) 0.001 - any (scene units)	200	Width of the box everything burns in. Leave a margin round the flames; anything that leaves the box is gone.
Depth (Y) 0.001 - any (scene units)	200	Depth of the box.
Height (Z) 0.001 - any (scene units)	300	Height of the box. Fire and smoke rise, so give it room above the source.
Cells on longest side (0 = max my GPU holds) 0 - 4096	128	Cells along the longest side: the detail. 128 for blocking, 256-512 for finals. **0 = the most your graphics card holds** (about 550 on 24 GB).
BOUNDARIES		
Solid floor on / off	on	The bottom of the box is a solid floor; smoke spreads along it. Off for fire in mid-air.
Open sides (smoke leaves) on / off	on	Smoke may leave through the sides and clean air comes in. Keep on, or smoke piles up in the box.
Open top on / off	on	Smoke may leave through the top. Keep on unless you want a ceiling.
Simulate on the GPU (CUDA) on / off	on	Simulate on an NVIDIA card. Off runs on the CPU, many times slower.
Fire stays in the world when the box moves on / off	on	Moving or animating the box does not drag the fire along with it. Off only if the fire should travel with the box (a torch carried by a character).

Live (real time)

Control / range	Default	What it does, when to change it
LIVE		
Live Off (show cache) / Follow the timeline / Run continuously	Follow the timeline	**Off** shows the last SIMULATE; **Follow the timeline** simulates as you play or scrub; **Run continuously** keeps running without Play.
Live cells on longest side 16 - 512	64	Detail of the live viewport simulation. 32-64 stays smooth; it does not change the final.
Live substeps 1 - 8	1	Live accuracy steps. Raise only if live fast motion looks broken.

Sources

Control / range	Default	What it does, when to change it
SOURCES		
Burning objects / particles objects	-	Meshes, Particle Flow, tyFlow or VanguardFluid particles that burn.
Emit from Volume (inside) / Surface (shell)	Volume (inside)	**Volume** fills the inside of the object with fuel; **Surface** only a shell on its skin - use it for logs, text and anything large.
Shell / particle radius 0 - any (scene units)	2	Shell thickness in Surface mode, and the radius around each particle.
FUEL		
Fuel per second 0 - 1000	4	How much fuel the sources give each second: the size of the fire. Animate it to light up or die down.
Source temperature (K) 300 - 4000	1100	Temperature of what comes out. 1000-1200 K for wood, 1500+ for explosions.
Cold smoke per second 0 - 1000	0	Cold smoke that does not burn: chimneys, steam, dust clouds.
MOTION		
Outflow speed up (m/s) -100 - 100	1	Speed the gas leaves the source. Raise it for jets and explosions; negative sucks in.
Outflow strength 0 - 1	0.3	How hard that speed is forced (0 = only a nudge, 1 = exactly that speed).
Flicker 0 - 1	0.5	Breaks the source into living, flickering patches. 0.5-0.9 looks natural.
CATCHES FIRE		
Objects that catch fire objects	-	Objects that are not burning yet but catch fire when the flames reach them, then burn for *Burns for* seconds. Spreading fire, HairFx fur.
Fuel while burning 0 - 1000	4	Fuel an object gives while it burns.
Burns for (s) 0 - 10000	8	How long a caught object keeps burning.
MOTION		
Push Straight up / Along each source's Z (nozzle) / Particle velocity	Straight up	**Straight up**; **Along each source's Z** for a flamethrower or a gas leak; **Particle velocity** for particles.
Inherit object motion 0 - 5	1	A moving source drags its flames with it (a swung torch, a falling burning object).
TORNADO EVENTS		
Events file (empty = _tornado) folder	empty	Fire from Vanguard Tornado: sparks and impacts it recorded light fires here. Empty finds it next to the scene; `none` switches it off.
Minimum energy 0 - any	1	Ignore weaker impacts.
Fire radius 0 - any (scene units)	10	Size of the fire an impact starts.
Impact fire burns for (s) 0 - 10000	3	How long an impact fire burns.
Positions in Scene units / Metres	Scene units	Units of the events file. Tornado writes metres and says so; leave on Scene units otherwise.
SOURCES		
Dust sources (smoke, saved as dust) objects	-	Objects that only throw dust (no fuel, no heat). Saved as a separate `dust` grid, so it can get its own colour at render.

Combustion

Control / range	Default	What it does, when to change it
BURN		
Ignition temperature (K) 300 - 3000	550	Fuel above this temperature burns. Lower = catches easier.
Burn rate (1/s) 0 - 100	6	How fast fuel is used up. High = short, bright flames; low = long, lazy flames.
Heat release 0 - 20	2.5	Heat given by burning: hotter, faster rising fire.
Smoke from burning 0 - 10	0.6	Smoke made by burning. 0.05 candle, 0.3 campfire, 1.5+ oil fire.
Gas expansion 0 - 10	0.6	Burning gas pushes outward. High values make fireballs bloom.
MOTION		
Buoyancy -20 - 50	2	How strongly hot gas rises.
Cooling (1/s) 0 - 50	1.2	How fast the gas cools: high = short flames that turn to smoke quickly.
Turbulence (vorticity) 0 - 50	4	Keeps the small swirls alive: more curls and billows. 4-10 typical, up to 15 for explosions.
Flame tongues (m/s2) 0 - 500	0	Extra random push that tears the flame into tongues. 0 off, 20-40 for a lively fire.
Tongue size (m) 0.01 - 100	0.25	Size of those tongues in metres.

Smoke & Air

Control / range	Default	What it does, when to change it
SMOKE		
Smoke weight -5 - 5	0.05	Positive = smoke sinks a little as it cools; negative = keeps rising.
Smoke fades (1/s) 0 - 20	0.15	How fast smoke fades away. 0.05 lingers for ages, 2 vanishes quickly.
WIND		
Wind X (m/s) -100 - 100	0	Constant wind along X.
Wind Y (m/s) -100 - 100	0	Constant wind along Y.
Wind Z (m/s) -100 - 100	0	Constant wind along Z.
Wind grip (1/s) 0 - 50	0	How quickly the air takes the wind's speed. 0 = wind off; 0.5 gentle; 5 locks everything to the wind.
OBSTACLES		
Colliders objects	-	Objects the fire and smoke flow around (walls, logs, letters). They may move.
FORCES		
Max force fields (Wind, Gravity...) objects	-	Max space warps (Wind, Gravity, Vortex, Vanguard Tornado wind) that push the gas.

Fire Look (render)

These shape the built-in preview render and what VanguardRender reads. They do not change the simulation.

Control / range	Default	What it does, when to change it
FIRE		
Fire brightness 0 - 100	1	Brightness of the flames in the preview render and the Render bridge.
Fire tint colour	RGB 255 255 255	Multiplies the flame colour. Leave white for real fire.
Colour temperature x 0.2 - 4	1	Shifts the flame colour: below 1 redder, above 1 whiter/hotter.
Glow on smoke 0 - 20	1	How much the fire lights its own smoke from inside.
SMOKE		
Smoke colour colour	RGB 76 76 82	Colour of the smoke in the preview.
Smoke density 0 - 200	3	How thick the smoke looks at render.
LIGHT		
Key light 0 - 20	1	Strength of the key light in the preview.
Self shadow 0 - 1	1	Self shadowing in the smoke: 1 = full, deep billows.
Sky light 0 - 20	1	Soft fill light from the sky.
Exposure (stops) -10 - 10	0	Preview exposure in stops.
DETAIL		
Fine detail (render) 0 - 4	0.4	Adds fine noise to the rendered smoke edges.
Detail size (cells) 0.1 - 10	1	Size of that noise in cells.

Viewport & Export

Control / range	Default	What it does, when to change it
VIEWPORT		
Show Fire + smoke / Fire only / Smoke only / Temperature / Box only	Fire + smoke	What the viewport draws: fire and smoke, one of them, temperature, or only the box.
Max points 1000 - any	300000	Point budget of the viewport display. Lower if the viewport is slow.
Display density 0.01 - 100	1	Makes the viewport display thicker or thinner (display only).
EXPORT		
VDB folder folder	empty	Older separate VDB folder (Export VDB button). Usually leave empty and use the Output folder.
Write velocity (motion blur) on / off	off	Add velocity grids `vel.x/y/z` for motion blur.
VIEWPORT		
Show domain box on / off	on	Draw the box in the viewport.

Simulation & Cache

Control / range	Default	What it does, when to change it
RANGE		
Start frame -100000 - 100000	0	First frame SIMULATE computes.
End frame -100000 - 100000	100	Last frame SIMULATE computes.
QUALITY		
Substeps per frame 1 - 16	1	Steps per frame. 1-2 for calm fire, 3-6 for fast explosions or jets (no streaks or holes).
Time scale 0.01 - 10	1	Below 1 = slow motion, above 1 = faster.
Pressure Fast / Balanced / Accurate	Balanced	**Fast** for tests, **Balanced** for most, **Accurate** for big explosions where the shape must be exactly round.
CACHE		
Cache folder folder	empty	Folder for the per-frame cache (`.vfc`). Empty = next to the scene. Can be deleted any time; SIMULATE rebuilds it.

Outputs (written by SIMULATE)

Control / range	Default	What it does, when to change it
OUTPUTS		
Write VDB while simulating on / off	on	Write an OpenVDB file each frame during SIMULATE.
VDB LAYERS		
density (smoke) on / off	on	Grid `density` (smoke).
temperature (Kelvin) on / off	on	Grid `temperature` in Kelvin - drives fire colour in most renderers.
flame on / off	on	Grid `flame` (0-1): the visible fire, easiest for emission.
fuel on / off	off	Grid `fuel` . Rarely needed.
OUTPUTS		
Write PRT particles (Krakatoa / Frost) on / off	off	Also write PRT particle files for Krakatoa or Frost.
PRT particles per cell 1 - 8	1	Particles per cell in the PRT.
Render preview images (PNG) on / off	off	Render a PNG of every frame with the built-in fire renderer while simulating - instant dailies.
Preview width 64 - 8192	1280	Width of those PNGs; height follows the render settings.
Output folder folder	empty	Folder for VDB, PRT and PNG. Empty = next to the scene.
Render from camera (empty = viewport) objects	-	Camera for the preview images; empty uses the active viewport.
DETAIL		
Flow displacement (VDB + preview) 0 - 10	0	Fine detail that rolls with the smoke, added to the VDB and preview (not the cache). 2-4 for crisp billow edges; 0 off.
Displacement size (cells) 1 - 64	4	Size of that detail in cells. 3 sharp, 8 broad.

Fluid & Water

Control / range	Default	What it does, when to change it
WATER PUTS FIRE OUT		
Water (VanguardFluid / particles / meshes) objects	-	Water that puts the fire out: VanguardFluid, particles or meshes.
Quench strength (1/s) 0 - 100	8	How fast water kills the fire.
Steam (smoke) from quenching 0 - 10	0.5	Steam (white smoke) made when water hits fire.
Particle radius 0 - any (scene units)	2	Radius around each water particle.
Water is also an obstacle (fire flows around it) on / off	on	The water is also an obstacle the flames flow around.

4 Recipes

The first four are built-in presets (Simulate rollout › Preset › Apply); the values are listed so you can start from them and tune. The fifth is the *Fire text* sample scene. Anything not listed stays at its default.

Candle

Box 0.12 × 0.12 × 0.36 m, 96 cells.

Fuel 2.5 · Source 1000 K · Burn rate 10 · Heat 1.8 · Smoke from burning 0.05 · Expansion 0.3 · Buoyancy 3 · Cooling 3 · Turbulence (vorticity) 1 · Smoke fades 2 · Outflow 0.2 · Flicker 0.3

Campfire

Box 2 × 2 × 3 m, 128–256 cells. Emit from Surface, logs as sources.

Fuel 6 · Source 1200 K · Burn rate 5 · Heat 3 · Smoke 0.3 · Expansion 0.8 · Buoyancy 2.5 · Cooling 1 · Vorticity 6 · Smoke fades 0.6 · Outflow 1 · Flicker 0.7

Chimney smoke / steam

Box 3 × 3 × 8 m, 128 cells. No fire, only cold smoke carried by wind.

Fuel 0 · Cold smoke 5 · Source 450 K · Buoyancy 1 · Cooling 0.3 · Vorticity 3 · Smoke fades 0.05 · Outflow 2 / strength 0.5 · Wind X 1.5 · Wind grip 0.5

Ground explosion

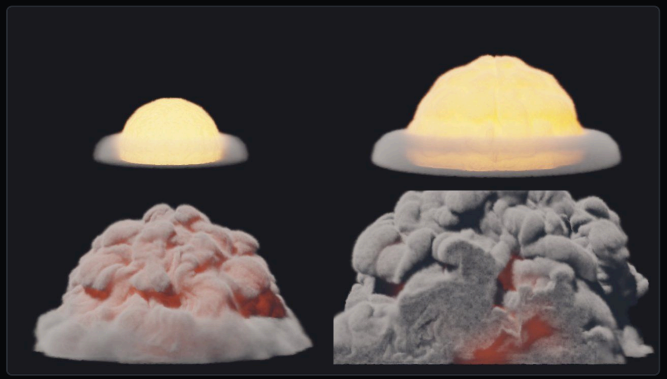
Box 44 × 44 × 32 m, resolution 0 (all your card holds). The preset builds the burst, debris trails and dust ring itself.

Fuel 18 · Source 1700 K · Burn rate 5 · Heat 4 · Smoke 2.5 · Expansion 1.5 · Buoyancy 2.2 · Cooling 0.7 · Vorticity 14 · Flame tongues 30 / 3 m · Smoke fades 0.04 · Outflow 4 · Flicker 0.9 · Substeps 6 · Flow displacement 4 / 3 · VDB velocity on

Burning text / logo

Extruded text 5 m high as both **source** and **collider**, Emit from Surface, shell 0.18 m. Box text width + 8 m × 12 × 20 m, 448 cells, Substeps 3.

Fuel animated 0 (frame 8) → 9 (frame 34) → 3.5 (frame 60) · Heat 3 · Burn rate 9 · Expansion 0.5 · Buoyancy 2 · Cooling 3.2 (keeps the letters readable) · Smoke from burning 0.15 · Smoke fades 1.6 · Vorticity 10 · Flame tongues 25 / 0.6 m · Flicker 0.8 · Flow displacement 3 / 3



Ground explosion preset, frames 8 – 60.



Burning text sample.

5 Rendering & export

OpenVDB — any renderer

Tick **Outputs › Write VDB while simulating** and the layers you need. SIMULATE writes `<name>_0000.vdb` per frame into the Output folder. Load the sequence in your renderer's volume object:

Renderer	Load with	Map
V-Ray	VRayVolumeGrid	Smoke ← density, Fire ← temperature (or flame)
Arnold	Arnold Volume + Standard Volume	density → density, temperature → Blackbody
Corona	CoronaVolumeGrid	density → absorption/scatter, temperature → emission
Redshift	RS Volume	density / temperature / flame
Krakatoa, Frost	PRT files (Outputs › Write PRT)	Density, Temperature, Emission

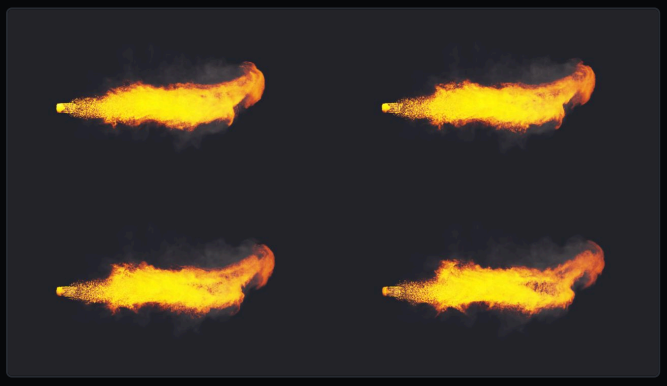
Grid names: `density` (smoke), `temperature` (Kelvin), `flame` (0–1), `fuel`, `dust`, and `vel.x` / `vel.y` / `vel.z` for motion blur. VDB is written in metres-correct scene units, so it lines up with the domain.

Typical settings

- **Fire colour:** drive emission by `temperature` with a blackbody, range 800–1800 K; or by `flame` 0–1 with an orange–yellow ramp.
- **Smoke:** density multiplier 1–5, scatter grey 0.3–0.5, slight forward anisotropy (0.3).
- **Step size:** 0.5–1 cell. Smaller only if you see banding.
- **Motion blur:** tick *Write velocity*, then enable velocity motion blur in the volume object.
- **Fine detail:** Flow displacement 2–4 is baked into the VDB — no renderer setup needed.

Built-in preview render

Render preview images (PNG) renders every frame with Vanguard Fire's own GPU fire renderer from the chosen camera — dailies in seconds, alpha included, ready to comp over a plate. **VanguardRender** reads the fire directly, no VDB needed.



Flamethrower sample: Push along the nozzle's Z.



Spreading fire: objects that catch fire one after another.

6 Troubleshooting & FAQ

Smoke piles up and fills the box.
Tick **Open sides** and **Open top**, raise **Smoke fades**, or make the box bigger. Smoke that cannot leave has nowhere to go.

The fire is a blob, no detail.
Raise **Cells on longest side** (or set 0), add **Flame tongues** 20–40 and **vorticity** 6–10, and **Flow displacement** 2–4 for the export.

The text/logo disappears in flames.
Use **Surface** emission with a thin shell, add the object as a **collider**, and lower the fuel after it has caught.

"Stopped: above the unlicensed 64-cell limit".
No licence on this computer. See Activate on page 2.

My disk is full of .vfc files.
Those are caches. Delete them freely (or **Clear cache**); SIMULATE rebuilds them. Keep the VDBs you render from.

Flames are short and turn to smoke at once.
Lower **Cooling** and **Burn rate**, raise **Fuel per second**.

Holes, streaks or exploding values in fast motion.
Raise **Substeps** to 3–6. Do not let sources jump: animate them shrinking away instead of teleporting.

SIMULATE is slow.
Check that **Simulate on the GPU** is on and another program is not using the card (a render in another Max shares it). The status line shows the time of each stage per frame.

The installer cannot replace the plugin.
Close every 3ds Max and run it again.

A sample scene does nothing.
The samples open in light Live mode. Press Play, or raise the resolution and press SIMULATE. Smoke tornado needs Vanguard Tornado installed.

7 Requirements & licence

- Windows 10 / 11, 64-bit; 3ds Max 2024, 2025, 2026 or 2027.
- NVIDIA graphics card with a current driver (CUDA). Without one, Vanguard Fire runs on the CPU, much slower.
- Video memory sets the detail: about 256 cells on 8 GB, 512+ on 24 GB. *Resolution 0* finds your limit.
- Disk: a 512-cell VDB frame is roughly 50–300 MB; keep the cache on a fast SSD.

One licence, one computer. The licence is tied to the Hardware ID. Changing computer? Contact us and we move it.

Support: support@vanguardfx.pro · vanguardfx.pro



Vanguard Fire with Vanguard Tornado: the tornado's wind drives the fire column.