VANGUARDFX



Vanguard Tornado

A complete GPU tornado for 3ds Max: funnel, dust, debris, storm cloud, lightning and rain, plus PhysX destruction of whatever stands in its path.

User guide
Version 1.2.13

3ds Max
2024 · 2025 · 2026 · 2027

Renderers
Vanguard Render · Corona · V-Ray

Support
support@vanguardfx.pro

CHAPTER 1

Getting started

Vanguard Tornado is a single scene object. Place it, animate where it goes, and press Play. Particles are simulated on the GPU and each frame is cached in memory, so scrubbing backwards and forwards is instant. The same wind field that moves the dust also tears apart buildings, cars, trees and anything else you give it, using NVIDIA PhysX 5.

Install

1. Close every running copy of 3ds Max.
2. Download `VanguardFX_Tornado_Setup` from your account on vanguardfx.pro and run it. Tick the Max versions you use (2024–2027).
3. The installer also places the PhysX GPU module in `Program Files\VanguardFX\PhysX`, shared with Vanguard Shatter.
4. Start Max. The tornado is in **Create › Geometry › VanguardFX › VanguardTornado**.

Activate

1. Create a VanguardTornado and open the **Licence** rollout in the Modify panel. It shows this computer's **machine ID** (Hardware ID).
2. Sign in at vanguardfx.pro. Start the free 7-day trial or buy a plan, open **My Licences** and press **Download licence file**.
3. Back in Max, press **Load file…** in the Licence rollout and choose that file. Every tornado in the scene unlocks at once.

TRIAL

The 7-day trial shows the whole tool in the viewport with up to 2 million particles. Exporting `.prt` and `.vdb` needs a plan. Without any licence the object shows only its badge.

ONE LICENCE, ONE COMPUTER

The licence file is bound to the machine ID. To move to another computer, contact support.

WHERE THINGS GO

The destruction cache and helper files are written next to your scene, in a folder named `<scene>_tornado`. Save the scene before building destruction, and copy that folder along with the .max file.

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CHAPTER 2

Your first result in 5 steps



STEP 1

Place the tornado

Create › Geometry › VanguardFX › **VanguardTornado**, then click in the Top viewport. Where you click is the base of the funnel on the ground. The default **EF3 classic wedge** preset is ready to play; switch **Shape › Preset** to try a rope, a wedge or a waterspout.



STEP 2

Animate its path and press Play

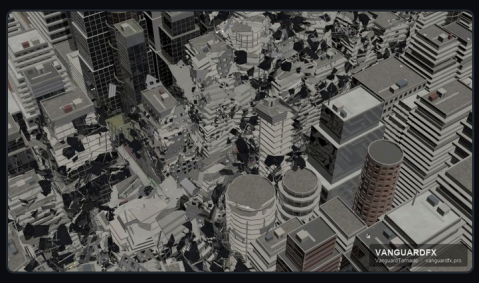
Turn on **Auto Key**, go to the last frame and move the tornado. It follows that path exactly; add a few keys to make it curve. Press **Play**: the first pass simulates, after that every frame comes from the cache. Changing the path later re-simulates from the start.



STEP 3

Give it something to destroy

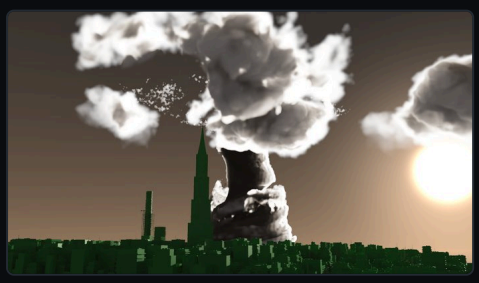
Build a VanguardCity, or add your own objects to the tornado's target list. City's presets (NeoTokyo, Tehran, Miami) have trees, cars and poles switched on; the default city has only buildings. **Save the scene now**.



STEP 4

Build destruction

In **City and Collision › Destruction physics**, set Solver to **PhysX (cinematic)** and Destroy to **From the root**. Press **BUILD DESTRUCTION**. Pieces appear in the viewport as frames finish; Esc stops and keeps what is built. The report has a **Go to the first break** button.



STEP 5

Light and render

Make a camera and look through it. Pick your renderer in Render Setup, then press **BUILD RENDER SETUP** at the bottom of **Render Look**. It adds sun and sky, sets up the volume or instances, and offers a preview render. Test at 6–12 passes and half resolution; render the final only when motion and light are right.

> **SHORTCUT**
>
> **Render Look › BUILD SHOT** does steps 2–5 for you: it builds a path, a camera, the destruction and the render setup for one of four ready shots. Start there, then change anything by hand.

CHAPTER 3

Every control explained

The rollouts are listed in the order they appear in the Modify panel. Every value lives in the object's parameter block: it is saved with the scene, undoable, scriptable under the grey name (for example `$VanguardTornado001.maxWind = 90`), and most can be animated. Ranges are the hard limits of each spinner.

Simulation

SOLVER

Mode default Analytic (fastest) Analytic computes the wind from a formula at every point: fastest, fully repeatable. Hybrid adds a small fluid grid that rides with the tornado, giving real eddies and smoke-like curls at some cost.

Start frame -100000–100000, default 0 Frame the simulation starts from. Move it if the tornado should already be running when the shot begins.

Seed 0–99999, default 1 Random seed for particles and turbulence. Change it for a different-looking tornado with identical settings.

Particles (M) 0.1–150, default 12 Maximum live particles, in millions. 5-20 M is a good range; above 40 M needs a 12 GB+ GPU.

Units default System units System units uses Max's unit setup. 1 unit = 1 m treats one scene unit as a metre, for scenes built without units.

RESET SIMULATION Throws away the cached frames and simulates again.

Shape

FUNNEL

Preset default EF3 classic wedge Loads a complete funnel: EF3 wedge (default), EF1 rope, EF5 monster wedge, multi-vortex, leaning stovepipe, dust devil, waterspout. Any later edit switches it to Custom.

Cloud base (m) 20–5000, default 600 Height of the cloud base, i.e. the funnel's top. Real tornadoes: 300-1500 m.

Core radius (m) 1–1000, default 40 Radius of the strongest wind ring at the ground. Rope 5-15 m, classic 30-60 m, wedge 100-400 m.

Flare aloft 0–20, default 3 How much the funnel widens toward the cloud. 0 = straight column, 3 = classic cone, 8+ = wedge.

Funnel width 0.05–2, default 0.55 How much of the core is visible condensation. Lower = thin, ragged funnel; 1+ = full, solid funnel.

Spin default Counter-clockwise Rotation direction. Northern-hemisphere tornadoes are almost always counter-clockwise.

LEAN AND ROPE

Lean X (m) -5000–5000, default 0 Horizontal offset of the funnel top from its base, in metres - the classic leaning tornado.

Lean Y (m) -5000–5000, default 0 Same, on the Y axis.

Lean curve 0.2–5, default 1.6 Shape of the lean: 1 = straight diagonal, 2-3 = upright at the base bending late.

Rope snake (m) 0–1000, default 0 Snake-like sideways wander of the funnel, in metres. Use 20-150 m for the rope stage.

Rope speed (Hz) 0–5, default 0.15 How fast the rope wander moves (cycles per second).

Wind

ROTATION

Max wind (m/s) 1–150, default 70 Peak tangential wind. EF1 ~40, EF3 ~70, EF5 ~110 m/s. Drives destruction thresholds too.

Core rise 0.2–4, default 1 How sharply the wind rises inside the core. Higher = tighter, harder core.

Outer falloff 0.1–4, default 0.7 How slowly wind falls off outside the core. Lower = wind reaches further out.

Meso wind (m/s) 0–80, default 18 Slow parent rotation (mesocyclone) around the whole storm. Makes the cloud above turn.

Meso radius (m) 10–10000, default 900 Radius of that parent rotation.

IN AND UP

Inflow (m/s) 0–100, default 25 Ground-level wind pulled toward the core. This is what drags dust and debris in.

Inflow depth (m) 1–1000, default 60 Height of the inflow layer above ground.

Updraft (m/s) 0–150, default 45 Vertical speed lifting material up the funnel.

Updraft width 0.2–6, default 1.4 Width of the updraft relative to the core.

Eye downdraft 0–1, default 0.25 Sinking air in the centre of wide tornadoes; opens a hollow core. 0 for ropes.

SUCTION VORTICES

Count 0–8, default 0 Number of small sub-vortices orbiting the main one. 3-6 for a multi-vortex look; 0 off.

Wind (m/s) 0–120, default 30 Extra wind inside each sub-vortex.

Size 0.02–1, default 0.18 Sub-vortex size as a fraction of the core.

Orbit 0.1–3, default 0.8 Orbit radius of the sub-vortices relative to the core.

TURBULENCE

Large (m/s) 0–60, default 8 Large, slow turbulence: breaks the funnel's symmetry.

Medium (m/s) 0–60, default 5 Mid-scale turbulence: puffs and lobes.

Small (m/s) 0–60, default 2.5 Fine turbulence: ragged edges and dust detail.

Scale (m) 1–5000, default 120 Size of the largest turbulence features, in metres.

Evolution 0–10, default 1 How fast turbulence evolves. 0 freezes it.

Particles

BIRTHS PER SECOND (THOUSANDS)

Dust 0–20000, default 400 Dust particles born per second (thousands), drawn from the ground under the inflow.

Debris 0–5000, default 15 Debris particles born per second (thousands). These render as flying pieces.

Condensation 0–20000, default 300 Condensation particles per second - the visible funnel itself.

LIFE (SECONDS)

Dust 0.5–300, default 14 Seconds a dust particle lives. Longer = larger dust cloud, more memory.

Debris 0.5–300, default 30 Seconds a debris particle lives.

Condensation 0.2–120, default 6 Seconds a condensation particle lives. Short keeps the funnel crisp.

BEHAVIOUR

Pickup radius 0.5–20, default 3 Distance (in core radii) at which the ground starts feeding dust.

Dust lag (s) 0.01–5, default 0.15 How long dust takes to follow the wind. Small = dust traces the wind exactly.

Debris lag (s) 0.05–20, default 1.8 Inertia of debris. Higher = heavier, slower-reacting pieces.

Debris weight 0–2, default 0.6 How strongly gravity pulls debris back out of the funnel.

Bounce 0–1, default 0.2 How much particles bounce off the ground and colliders.

Friction 0–1, default 0.6 How much particles slide on contact.

Hybrid Solver

GRID THAT FOLLOWS THE TORNADO

Resolution 16–384, default 96 Hybrid only: cells across the moving grid. 96 is fast, 192+ for close-ups.

Analytic share 0–1, default 0.5 Hybrid only: blend between the formula wind (1) and the simulated grid (0).

Forcing (1/s) 0–20, default 2 Hybrid only: how hard the grid is pulled toward the analytic tornado.

Vorticity 0–5, default 0.4 Hybrid only: keeps small swirls alive (vorticity confinement).

Buoyancy 0–10, default 1 Hybrid only: warm-air lift inside the grid.

Dissipation 0–2, default 0.05 Hybrid only: how quickly grid motion dies out.

Pressure iters 2–200, default 30 Hybrid only: solver accuracy. 30 is enough; raise if the grid looks compressible.

City and Collision

DESTRUCTION (VANGUARDCITY)

Breaks at (m/s) 5–150, default 32 VanguardCity: wind speed at which a building starts losing pieces.

Debris / bldg 0–200000, default 4000 VanguardCity: maximum debris particles a building can release.

Collider cell (m) 0.25–50, default 2 Voxel size of the collider built from your targets. Smaller = more exact, slower.

TORNADO DESTRUCTION (ANY MESH)

Piece size (m) 0.5–50, default 2 Classic destruction: size of pieces cut from arbitrary meshes.

Weight (kg/m3) 1–2000, default 12 Classic destruction: density of those pieces.

Reach (x core) 0.5–20, default 2.5 Classic destruction: reach of the damage, in core radii.

Whole if under (m) 0–100, default 7 Objects smaller than this fly away in one piece instead of being cut.

Hold in air (s) 0.2–120, default 6 How long a lifted piece stays airborne before falling out.

DESTRUCTION PHYSICS

Solver default PhysX (cinematic) Fast (classic) is a quick approximation; PhysX (cinematic) is full rigid-body physics on the GPU with NVIDIA PhysX 5.

Destroy default From the root (buildings fall) Surface takes things under 2 tonnes (glass, trees, cars, furniture). From the root breaks whole buildings, which lean and fall on their neighbours.

Build-up (s) 0–30, default 3 Seconds the tornado takes to reach full strength: light things go first, buildings later.

Debris size (m) 0.3–10, default 2.5 Typical piece size. Smaller = finer, heavier to simulate.

Structure strength 0.05–20, default 1 Overall building strength. Higher = only the core of the tornado breaks them.

Max pieces (0 = auto) 0–400000, default 0 0 measures your computer once and picks a count that keeps each frame near "Seconds a frame". Set 5,000-15,000 by hand on slower PCs.

Seconds a frame 0.5–60, default 2.5 Target build time per frame used by the automatic piece count.

From frame (-1 = auto) -1–100000, default -1 First frame of destruction; -1 skips frames before the wind arrives.

To frame (-1 = end) -1–100000, default -1 Last frame of destruction; -1 = end of the timeline.

WHAT THE TORNADO TAKES

Glass breaks default on Windows break and fly.

Walls / buildings break default on Facades, roofs, floors and structure break.

Cars lift off default on Parked cars lift with their real weights (car 1.4 t, truck 9 t, fire engine 15 t).

Street props go default on Signs, bins, benches and other street furniture go.

Trees default Snap or uproot Stay, Snap (break at the trunk), Uproot, or a mix.

Power poles default Fall + sparks Power poles stay, fall, or fall with sparks and arcs.

Hero bldgs (Shatter) 0–50, default 0 With Vanguard Shatter installed: this many buildings nearest the camera break with Shatter's finer fracture.

WHAT BREAKS

Break default Everything in the path Break everything in the path, or only faces with the material IDs below.

Material ID 0–1000, default 13 Material ID that may break (when "Only these material IDs" is set).

Material ID 0–1000, default 14 Second breakable material ID.

Material ID 0–1000, default 0 Third breakable material ID (0 = unused).

BONDS AND COLLISIONS

Glue strength 0.05–20, default 1 Glue between neighbouring pieces. Lower = buildings crumble.

Remnants left 0–1, default 0.5 Share of a broken building left standing as a ruin.

Lift into funnel 0–10, default 2 How readily broken pieces are drawn up into the funnel.

Collapse dust 0–10, default 1 Dust released where pieces break and land.

Shell thickness (m) 0–5, default 0.3 Thickness given to thin shells (facades) so pieces have volume.

Largest piece (m) 0.5–100, default 5 No piece will be larger than this.

Pieces collide default on Pieces collide with each other. Off is faster but they pass through.

Bounce 0–1, default 0.2 Restitution of pieces.

Friction 0–1, default 0.45 Friction of pieces.

PER KIND: WEIGHT X / SPIN

Building weight 0.05–20, default 1 Weight multiplier for building pieces.

Building spin 0–30, default 3 Tumble of building pieces in the air.

Car weight 0.05–20, default 1 Weight multiplier for cars.

Car spin 0–30, default 2.5 Tumble of cars.

Tree weight 0.05–20, default 0.5 Weight multiplier for trees.

Tree spin 0–30, default 5 Tumble of trees.

Pole weight 0.05–20, default 0.7 Weight multiplier for poles.

Pole spin 0–30, default 7 Tumble of poles.

Spin variation 0–1, default 0.5 Randomness of tumble between pieces.

BUILD DESTRUCTION Simulates the destruction over the frame range. Esc stops; finished frames are kept.

CLEAR DESTRUCTION Removes the destruction and restores the original objects.

BUILD COLLIDER FROM TARGETS Voxelises the target objects so particles collide with them.

WRITE CITY DESTRUCTION Writes damage for VanguardCity buildings.

WRITE EVENTS (Fire) Writes events.txt (impacts, sparks) for VanguardFire.

CREATE WIND (Fire, particles) Creates a wind space warp linked to every VanguardFire; add it to Particle Flow / tyFlow forces.

LINK WEATHER + CABLES Makes Vanguard Weather and Cables feel the tornado's wind.

LINK SHATTER (break as it passes) Glass with Vanguard Shatter on it breaks when the wind arrives.

Display

VIEWPORT

Points (M) 0.05–20, default 1.5 Points drawn in the viewport, in millions. Lower it if the viewport is slow.

Dust default on Show dust in the viewport.

Debris default on Show debris.

Condensation default on Show the funnel.

Cache (MB) 0–64000, default 3000 Memory used to keep simulated frames so scrubbing is instant. Lower on 16 GB machines.

Logo size 0.01–100000, default 10 Size of the viewport icon.

Storm and Lightning

STORM CLOUD (VANGUARDCLOUD MODEL)

Storm cloud default on Adds the rotating supercell cloud above the funnel.

Radius (m) 50–50000, default 1500 Radius of the storm cloud.

Depth (m) 50–20000, default 2500 Thickness of the cloud deck.

Coverage 0–1, default 0.75 How much of the sky the cloud fills.

Detail (m) 10–10000, default 450 Size of cloud billows.

Darkness 0–1, default 0.55 How dark the cloud underside is.

Points (M) 0.01–10, default 0.4 Viewport points for the cloud.

Rotation 0–10, default 1 Rotation speed of the cloud.

Seed 0–99999, default 11 Random shape of the cloud.

LIGHTNING (VANGUARDRENDER MODEL)

Lightning default on Lightning bolts inside and below the cloud.

Strikes / min 0–600, default 12 Bolt frequency.

To ground 0–1, default 0.6 Share of bolts that reach the ground.

Branching 0–2, default 0.6 How much bolts fork.

Brightness 0–10, default 1 Bolt intensity (also lights the cloud).

Width (m) 0.05–20, default 1.5 Bolt thickness.

Seed 0–99999, default 3 Random pattern of strikes.

Render as mesh default on Renders bolts as emissive geometry in Corona / V-Ray.

RAIN

Rain default on Rain curtains that follow the storm wind.

Drops (thousands) 0–5000, default 150 Raindrops, in thousands.

Fall speed (m/s) 0.5–60, default 9 Fall speed.

Angle (deg) 0–80, default 20 Slant of the rain.

Direction (deg) -360–360, default 0 Direction of the slant.

Gusts 0–1, default 0.5 Gusty variation in the rain.

Streak length 0.1–10, default 1 Length of rain streaks.

CREATE WET MAP (rain runs down) Builds a rain-streak wetness map and opens the Material Editor.

Render Look

ONE-CLICK SHOT

Shot default Town strike Ready shots for BUILD SHOT: town strike, countryside storm, city crossing, night supercell.

Destroy automatically on play default on Builds destruction automatically the first time you press Play.

BUILD SHOT (path, camera, destruction, render) Builds a path, camera, destruction and render setup for the chosen shot.

LOOK (ALL RENDERERS)

Preset default Dark storm Look preset for all renderers: Dark storm, Dusty dusk, Heavy wedge, Clean funnel.

Funnel density 0–50, default 3 Opacity of the funnel volume.

Dust density 0–50, default 1.5 Opacity of the dust skirt.

Darkness 0–1, default 0.6 Albedo of the funnel: 0 white condensation, 1 black dirt.

Dust warmth 0–1, default 0.5 Grey dust (0) to brown, earthy dust (1).

Cloud density 0–20, default 1 Opacity of the storm cloud.

PARTICLE RENDER (LIKE ORBFX)

Render as default Volume (VDB) Volume (VDB), Particles (Ink) or both.

Density 0–100, default 40 Ink: opacity of the particle render.

Particles x 1–256, default 3 Ink: extra particles generated per simulated one at render time.

Spread (m) 0–50, default 8 Ink: how far those extra particles scatter.

Point size (px) 0.2–16, default 0.7 Ink: point size in pixels.

Light 0–50, default 9 Ink: key light strength.

Ambient 0–5, default 0.05 Ink: sky fill.

Shadow grid 64–512, default 384 Ink: resolution of the self-shadow grid.

Streak (s) 0–3, default 0.05 Ink: motion streak length.

Spiral bands 0–1, default 0.35 Ink: strength of spiral banding.

Colour default Natural Natural, a custom colour, Water (blue-white spray) or Velocity (heat map by speed).

Colour R 0–1, default 0.25 Custom colour, red.

Colour G 0–1, default 0.5 Custom colour, green.

Colour B 0–1, default 0.8 Custom colour, blue.

Velocity max (m/s) 1–500, default 80 Speed shown as the hottest colour in Velocity mode.

Draw as default Volume + particles How Vanguard Render draws the tornado: particles, volume, or both (default).

Absorb R 0–10, default 1 Absorption per channel - tints what light passes through.

Absorb G 0–10, default 1

Absorb B 0–10, default 1

Scatter R 0–10, default 1 Scattering colour per channel - the colour of lit smoke.

Scatter G 0–10, default 1

Scatter B 0–10, default 1

Scatter amount 0–1, default 0.55 Scattering vs absorption balance. Higher = brighter, softer smoke.

Self shadow 0–2, default 1 Strength of self-shadowing; 1 is physical.

Volume cells 64–512, default 320 Resolution of the render volume. 320 default, 512 for close-ups.

Funnel = VanguardFire smoke default off Uses a VanguardFire smoke simulation as the funnel and switches off Tornado's own funnel. Debris, bolts and cloud stay.

Volume density 0–50, default 1 Overall density multiplier of the volume.

RENDER INK FRAME (over the last render) Renders the particle (Ink) layer over the last render.

CORONA / V-RAY

Add sun + sky default on BUILD RENDER SETUP also adds a low sun and stormy sky.

BUILD RENDER SETUP (Vanguard / Corona / V-Ray) Sets up Vanguard Render, Corona or V-Ray (whichever is current) and points the view at the render camera.

Export

TIMELINE RANGE

Volume res 16–1024, default 160 Resolution of exported .vdb volumes.

RENDER IN CORONA / V-RAY (INSTANCES)

Debris default on Corona / V-Ray: render debris as instanced pieces.

Debris size (m) 0.01–50, default 0.6 Base size of each debris instance; about 1 in 25 pieces is 3-8x larger and half of those are flat panels.

Dust and funnel default on Corona / V-Ray: render dust and funnel particles as instances.

Dust used (%) 0.1–100, default 15 Share of dust particles turned into geometry (memory saver).

Dust size (m) 0.01–50, default 0.35 Size of each dust instance.

EXPORT PARTICLES (.prt) Writes particles as .prt (Krakatoa / Frost / tyFlow).

EXPORT VOLUME (.vdb) Writes funnel, dust and cloud as OpenVDB for CoronaVolumeGrid / VRayVolumeGrid / Houdini.

CHAPTER 4

Presets & recipes

Each recipe starts from a fresh VanguardTornado. Set the values shown, and leave everything else at its default.

Storm over a city CINEMATIC

Shape › Preset	EF3 classic wedge
Wind › Max wind	80 m/s
Destruction › Solver / Destroy	PhysX / From the root
Build-up (s)	4
Storm cloud · Lightning · Rain	on · 12 /min · on
Render Look › Preset	Dark storm
Draw as · Volume cells	Volume + particles · 384

Thin rope at sunset BEAUTY

Shape › Preset	EF1 rope
Core radius · Flare	10 m · 0.6
Rope snake · Rope speed	90 m · 0.12 Hz
Lean X	250 m
Dust rate	150
Render Look › Preset	Dusty dusk
Funnel darkness · Dust warmth	0.35 · 0.8

Monster wedge, countryside SCALE

Shape › Preset	EF5 monster wedge
Core radius · Cloud base	300 m · 900 m
Max wind · Inflow	110 · 40 m/s
Particles (M)	25
Render Look › Preset	Heavy wedge
Shot	Countryside storm → BUILD SHOT

Multi-vortex DETAIL

Shape › Preset	Multi-vortex
Suction › Count	5
Suction wind · Size · Orbit	40 m/s · 0.2 · 0.9
Solver mode	Hybrid (grid + analytic)
Grid resolution · Vorticity	128 · 0.8
Render as	Particles (Ink)

Waterspout SEA

Shape › Preset	Waterspout
Colour	Water
Dust warmth · Funnel darkness	0 · 0.1
Debris rate	0
Rain · Lightning	on · off
Optional	FX menu: *Tornado* → *Waterspout* lifts a VanguardLiquid sea

Fast preview on a laptop SPEED

Particles (M) · Viewport points (M)	3 · 0.5
Cache (MB)	1000
Destruction › Max pieces	8000
Seconds a frame	1
Storm cloud points (M)	0.1

CHAPTER 5

Rendering & export

Vanguard Render (recommended)

The tornado renders as a true GPU volume: funnel, dust and storm cloud, with self-shadowing and a low backlit sun. A frame's volume is built once, so re-rendering the same frame is fast.

- **Draw as**: Volume, or Volume + particles (default).
- **Volume cells** 320 for wide shots, 512 for close-ups.
- Debris travels to the renderer as particles with size, kind and colour.
- **Funnel = VanguardFire smoke** swaps the funnel for a Fire simulation (for billowing smoke funnels).

Corona and V-Ray

The tornado renders as instanced geometry; destroyed buildings keep their own materials. Give the tornado a **Multi/Sub-Object** material:

ID	USED FOR
1	Dust
2	Debris
3	Funnel

Size and amount of pieces: **Export › Render in Corona / V-Ray**. Tick **Add sun + sky** before BUILD RENDER SETUP for storm lighting.



Funnel, storm cloud and dust skirt with a backlit sun.

Typical settings

	TEST	FINAL
Passes	6–12	64–256
Resolution	half	1920×1080+
Volume cells	256	384–512
Motion blur	off	on, 0.5 frame

Export

- **EXPORT VOLUME (.vdb)**: OpenVDB density per frame, at **Volume res**. Load with CoronaVolumeGrid, VRayVolumeGrid or Houdini.
- **EXPORT PARTICLES (.prt)**: for Krakatoa, Frost (meshing droplets) or tyFlow.
- Exports cover the timeline range and need a paid plan.

> **COLOUR AND MATERIAL OF THE PARTICLES**
>
> Render Look › Particle render › **Colour**: Natural, Custom (R/G/B), Water, or Velocity (heat map up to **Velocity max**). Absorb and Scatter R/G/B tint the volume. In Corona/V-Ray, use the material IDs above.

CHAPTER 6

Troubleshooting & FAQ

SYMPTOM	WHAT TO DO
No trees or cars break	They are off in the city. Use a City preset, or run: `VanguardCityTool.citySetParam $VanguardCity001 "treesOn=1;polesOn=1;lightsOn=1;signalsOn=1;trafficOn=1;trafficAnimate=0" 0`
Destruction disappeared after I changed the path	That is intentional; the old pieces no longer match. Press BUILD DESTRUCTION again.
A building vanished but no pieces show	The `<scene>_tornado` folder must sit next to the .max file. If it is missing, CLEAR DESTRUCTION, then BUILD again.
Each destruction frame is very slow	Set Max pieces to 0 (auto) or lower it by hand; lower Seconds a frame; lower Reach; switch off what the camera does not see.
The viewport is slow	Lower Display › Points (M) and Storm › Points (M). The render is not affected.
Out of memory, or Max feels heavy	Lower Cache (MB) and Particles (M). Don't run several heavy Max sessions at once; a city scene can take several GB each.
The tornado shows only a badge	No valid licence. Open the Licence rollout and load your licence file (Chapter 1).
Export buttons say a plan is needed	The trial allows working in the viewport only; PRT/VDB export needs a paid plan.
A preset seems to change nothing	Any edit after choosing a preset switches it to Custom. Choose the preset again to reload all its values.
Particles fly off far too fast in Fire / tyFlow	The wind space warp is a force with no ceiling. Give the particle system drag (Fire uses drag 0.5 with strength 0.3).
Is it physically correct?	The wind follows published tornado vortex models (core, inflow, updraft, suction vortices). Wind speeds are in real m/s, so EF ratings map directly to **Max wind**.
Does it need an NVIDIA GPU?	Yes. The particle simulation runs in CUDA, and PhysX destruction uses the same GPU. Without a CUDA-capable NVIDIA card the status line shows a GPU error.
Can I use it without VanguardCity?	Yes. Add your meshes to the target list. Small objects (under 7 m) fly whole, tall thin ones snap, the rest is cut into pieces.
Can I connect other plugins?	Yes, from **City and Collision**: CREATE WIND, WRITE EVENTS (Fire), LINK WEATHER + CABLES, LINK SHATTER. Each reports what it did, with an Open folder button when it writes a file.

CHAPTER 7

Requirements & licence

	MINIMUM	RECOMMENDED
3ds Max	2024	2024, 2025, 2026 or 2027
Operating system	Windows 10 64-bit	Windows 10 / 11 64-bit
GPU	NVIDIA GTX 10-series (CUDA required)	NVIDIA RTX 30/40/50 with 12 GB+
System memory	16 GB	32–64 GB for large cities
Driver	A current NVIDIA driver (needed for PhysX on the GPU)	

What it works with

PLUGIN	WHAT IT ADDS	
VanguardCity	A city that breaks with real weights: buildings, glass, cars, trees, poles, street furniture. Without City, Tornado still breaks any mesh you target.	recommended
Vanguard Render	Fast GPU volume rendering of the funnel, dust and storm cloud.	recommended
Vanguard Shatter · Fire · Cables · Crowd · Weather	Finer hero fracture, fire and sparks at impacts, power lines that snap, people who flee, rain that feels the wind.	optional

Licence

- **One licence, one computer**, bound to the machine ID shown in the Licence rollout.
- 7-day free trial: everything in the viewport, up to 2 M particles, no export.
- Plans: 30 days, 1 year or 2 years.
- Renew or move a licence from **My Licences** on vanguardfx.pro.

Support

Email support@vanguardfx.pro with your Max version, Tornado version and, if possible, the scene. Updates and release notes: vanguardfx.pro/tornado.html.

Destruction in Vanguard Tornado uses NVIDIA PhysX 5 (BSD-3 licence). NVIDIA and PhysX are trademarks of NVIDIA Corporation. 3ds Max is a trademark of Autodesk, Inc. Corona and V-Ray are trademarks of Chaos Software.



A VanguardCity block before the tornado arrives.