VANGUARDFX



Vanguard Render

The GPU renderer for 3ds Max — clouds, fire, hair, cities and liquid in one pass.

USER GUIDE · VERSION 1.8.33 · 3DS MAX 2024 – 2027

vanguardfx.pro

1 Getting started

Vanguard Render is VanguardFX's own renderer. It appears in **Render Setup > Assign Renderer** like Scanline, Arnold or V-Ray, and it renders VanguardCloud skies, VanguardLiquid water, VanguardTornado, VanguardHairFx fur and any ordinary mesh with physical materials on an NVIDIA card.

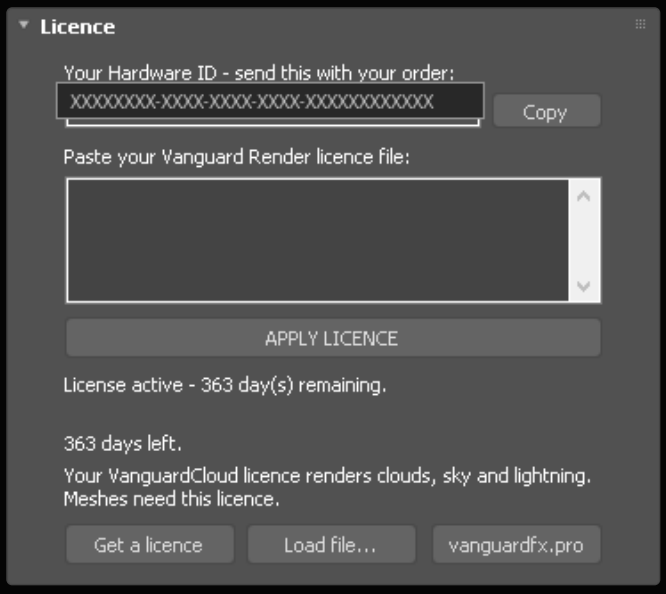
Install

1. Download the installer from **vanguardfx.pro/render.html** (or from *My licences* after purchase).
2. Close every running 3ds Max, run `VanguardFX_Render_Setup_v1.8.33.exe` and tick the Max versions you use (2024, 2025, 2026, 2027).
3. Windows may say "Windows protected your PC". Press *More info* > *Run anyway* — the installer is new and SmartScreen has not seen it often yet.
4. Start Max. The installer puts `VanguardRender.dlr` in each Max's *Plugins* folder, the **VanguardFX Light** script in *Startup*, and the AI denoiser beside the plug-in.

Activate

1. **Render Setup > Renderer** tab > **Licence** rollout. Press **Copy** beside *Your Hardware ID*.
2. On vanguardfx.pro buy a plan and paste that Hardware ID at checkout. The licence is tied to this one computer.
3. Sign in, open **My licences**, press **Download licence file**.
4. Back in Max press **Load file…** and choose it (or paste its text and press **Apply licence**). It works at once — no restart.

> The *licence key* the website shows first is not the licence *file*. If Max says so, download the file from My licences. A **VanguardCloud** licence already lets Vanguard Render draw clouds, sky and lightning; meshes need this licence.



Licence rollout (Hardware ID hidden here).



Common tab > Assign Renderer: pick **Vanguard Render** for Production.

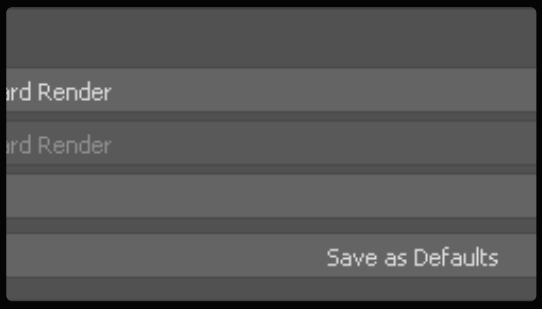
Where it appears in Max

- **Render Setup > Renderer**: Output, Quality and speed, Sun and lighting, Sky and atmosphere, Meshes and lights, Weather, Playback window, Licence, About.
- **Render Elements**: the VR passes (Alpha, Z Depth, Albedo, Normals, IDs, Reflection…).
- **Material Editor > VanguardFX**: Vanguard Material.
- **Create > Lights > VanguardFX**: VanguardFX Light. **Create > Helpers**: Vanguard Sky.

2 Your first result in 5 steps

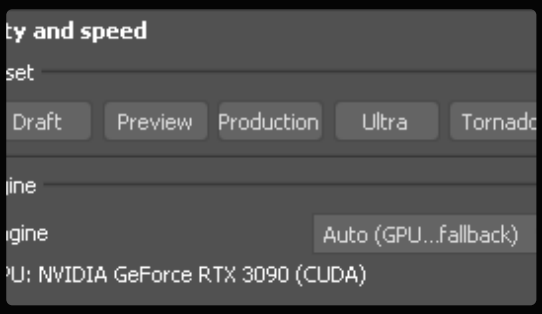
1 Assign the renderer

Press F10, open **Common > Assign Renderer**, click the button beside *Production* and choose **Vanguard Render**. Your existing Physical, Standard, V-Ray and Corona materials are read as they are.



2 Choose a preset

On the **Renderer** tab press **Preview** while you work and **Production** for the final. The engine reads your card on the line below.



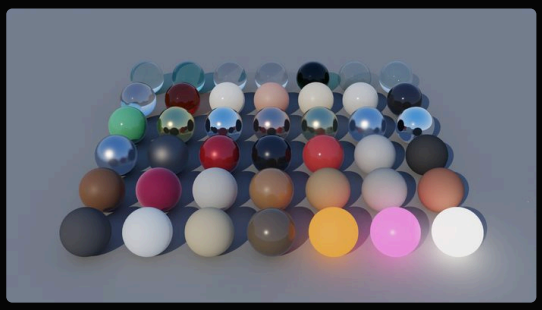
3 Light it

Do nothing and the built-in sun and sky light the scene. Add a Sun Positioner to aim it, or put an HDRI in **Rendering > Environment**.



4 Give it materials

Keep your materials, or apply a **Vanguard Material** and pick one of 43 substances — water, glass, gold, skin, car paint...



5 Render

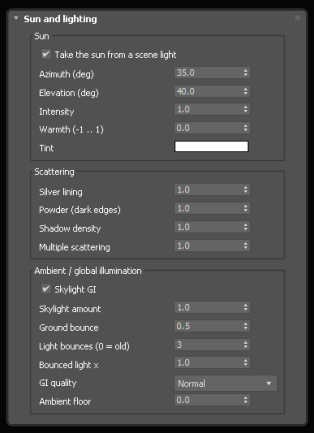
Press Render. Passes refine until the noise threshold is met, then the AI denoiser cleans the frame. Save as EXR for compositing or PNG/JPG to show.



3 Every control explained

All settings live on the **Renderer** tab of Render Setup and are saved with the scene. **Reset every setting to default** restores the defaults below.





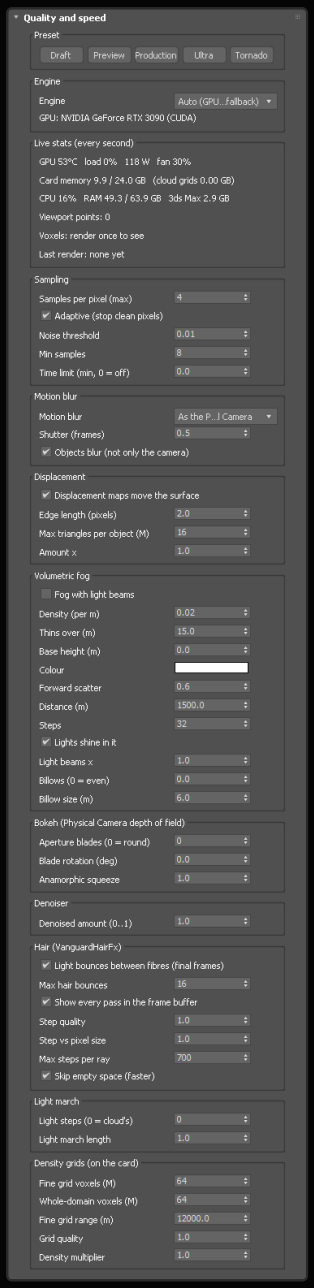
Output

Control	Range	Default	What it does · when to change it
IMAGE			
Background	list	Sky gradient	What shows behind the scene: alpha for compositing, the sky gradient, or Max's background colour (Rendering > Environment). Use the colour for a clean studio backdrop while the environment still lights the scene.
Scene units	list	Max's system units (cm, mm...)	Keep on Max's system units. The metre option exists only so scenes from before 1.8 render as they did.
Output colour	list	Display (tone mapped)	Display gives a finished, tone-mapped image. Linear writes scene-referred values for EXR compositing.
Exposure	0.01 – 64	1.0	Overall brightness multiplier. Change it before you touch lights.
Use Max's exposure control (EV)	on / off	off	Follow the Physical Camera's EV exposure control instead of the value above.
Tone mapping	list	Filmic (ACES)	How bright values roll off. Filmic (ACES) is the default film look; Clamp is hard and linear; Hable is softest.
Gamma	1 – 3	2.2	Output gamma. Leave at 2.2 unless your pipeline asks otherwise.
Contrast	0.2 – 3	1.0	Grade after tone mapping. 1 = neutral.
Saturation	0 – 3	1.0	Grade after tone mapping. 0 = greyscale, 1 = neutral.
RENDER ELEMENTS (PASSES)			
Z depth: white at	0 – 1e+07	0	VR Z Depth pass: the distance that is pure white.
Z depth: range	1 – 1e+07	60000	VR Z Depth pass: the distance over which it falls to black.
Velocity range (px)	0.1 – 1024	32	VR Velocity pass: pixels of motion per frame that map to full red/green.
Thickness range	0.1 – 1000	8	VR Thickness pass: the optical depth that maps to white.

Sun and lighting

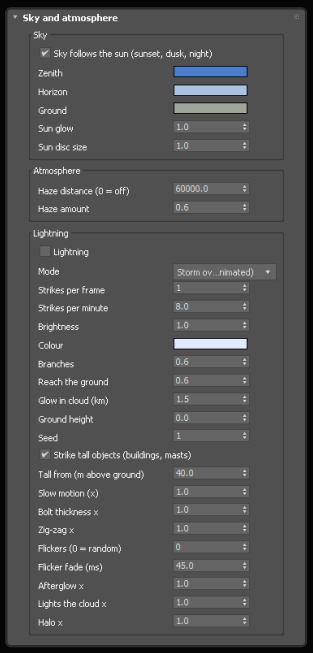
Control	Range	Default	What it does · when to change it
SUN			
Take the sun from a scene light	on / off	on	Take the sun direction from a Sun Positioner or direct light in the scene.
Azimuth (deg)	-360 – 360	35	Compass direction of the sun when there is no scene sun.
Elevation (deg)	-10 – 90	40	Sun height. Low values turn the sky to sunset; below 0, dusk.
Intensity	0 – 50	1.0	Sun strength.
Warmth (-1 .. 1)	-1 – 1	0.0	-1 cool, +1 warm late-afternoon light.
Tint	colour	rgb 255 255 255	Extra colour on the sun.
SCATTERING			
Silver lining	0 – 8	1.0	Bright cloud rims when looking towards the sun.
Powder (dark edges)	0 – 1	1.0	The dark-edged look of dense cumulus.
Shadow density	0 – 8	1.0	How darkly volumes shadow themselves.
Multiple scattering	0 – 8	1.0	Brightness of light scattered many times inside clouds.
AMBIENT / GLOBAL ILLUMINATION			
Skylight GI	on / off	on	Skylight occlusion. Off is faster and flatter.
Skylight amount	0 – 8	1.0	Amount of skylight.
Ground bounce	0 – 8	0.5	Light bounced up from the ground into cloud bases and under eaves.
Light bounces (0 = old)	0 – 8	3	Indirect bounces on meshes. 3 is a good final; 0 is the old look.
Bounced light x	0 – 4	1	Multiplies bounced light.
GI quality	list	Normal	Sampling of indirect light: Draft, Normal or High.
Ambient floor	0 – 1	0.0	A minimum ambient that lifts the darkest cores. Use sparingly.

Quality and speed



Control	Range	Default	What it does · when to change it
PRESET			
Draft / Preview / Production / Ultra / Tornado			One click sets sampling and march quality: Draft for layout, Preview for look-dev, Production for finals, Ultra for hero stills, Tornado for VanguardTornado scenes.
ENGINE			
Engine	list	Auto (GPU, CPU fallback)	Auto renders on the NVIDIA card and falls back to the CPU if the card is missing or out of memory.
SAMPLING			
Samples per pixel (max)	1 – 4096	4	Most samples a pixel may receive. 32 to 256 is a typical final; the adaptive stop usually ends sooner.
Adaptive (stop clean pixels)	on / off	on	Stops sampling pixels that are already clean, so time goes where the noise is.
Noise threshold	0.001 – 0.2	0.01	How clean a pixel must be to stop. Lower is cleaner and slower; 0.005 is a strict final.
Min samples	1 – 1024	8	Samples every pixel gets before it may stop. Raise it if small highlights are lost.
Time limit (min, 0 = off)	0 – 1440	0	Hard limit per frame, in minutes. What is done when it runs out is denoised and saved.
MOTION BLUR			
Motion blur	list	As the Physical Camera	Follow the Physical Camera's motion blur, always blur, or never blur.
Shutter (frames)	0.01 – 4	0.5	Frames the shutter stays open when Always on. 0.5 is a 180-degree shutter.
Objects blur (not only the camera)	on / off	on	Moving and deforming objects blur, not only the camera.
DISPLACEMENT			
Displacement maps move the surface	on / off	on	Displacement maps on materials really move the surface.
Edge length (pixels)	0.25 – 64	2	Target edge length after subdivision, in pixels. Smaller is finer and uses more memory.
Max triangles per object (M)	1 – 256	16	Safety cap: million triangles one object may become.
Amount x	0 – 100	1	Multiplies every displacement amount in the scene.
VOLUMETRIC FOG			
Fog with light beams	on / off	off	Height fog in which the sun and lights cast visible beams.
Density (per m)	0 – 5	0.02	Thickness at the base. 0.02 gives about 50 m of visibility.
Thins over (m)	0.1 – 100000	15	Height over which the fog thins to a third.
Base height (m)	-100000 – 100000	0	Full density below this height.
Colour	colour	rgb 255 255 255	What the fog scatters. White is neutral.
Forward scatter	0 – 0.95	0.6	0 glows evenly; towards 0.9 it is bright only when looking into the light.
Distance (m)	1 – 1e+06	1500	Furthest distance the fog is marched.
Steps	4 – 256	32	Samples along each ray. Raise if beams look stepped.
Lights shine in it	on / off	on	Max lights shine in the fog, not only the sun.
Light beams x	0 – 100	1	Strength of those beams.
Billows (0 = even)	0 – 1	0	Breaks the fog into billows. 0 = even.
Billow size (m)	0.05 – 100000	6	Size of one billow.
BOKEH (PHYSICAL CAMERA DEPTH OF FIELD)			
Aperture blades (0 = round)	0 – 12	0	Bokeh shape for the Physical Camera's depth of field: 0 round, 3 to 12 a polygon.
Blade rotation (deg)	-360 – 360	0	Turns the polygon.
Anamorphic squeeze	0.25 – 4	1	Stretches the bokeh as an anamorphic lens does. 1 = round.
DENOISER			
Denoised amount (0..1)	0 – 1	1	How much of the denoised image is used. 0.7 keeps a little grain.
HAIR (VANGUARDHAIRFX)			
Light bounces between fibres (final frames)	on / off	on	Light bounces between hair fibres in final frames: what makes fur soft and deep.
Max hair bounces	1 – 1024	16	Most fibre-to-fibre bounces per path. 16 matches 1024 within 1% at half the time.
Show every pass in the frame buffer	on / off	on	Refresh the frame buffer after every pass, so you watch the image clear.
Step quality	0.1 – 16	1.0	Volume march density for clouds, smoke and fire. 2 = twice the steps.
Step vs pixel size	0.1 – 16	1.0	March step as a multiple of the pixel footprint. Lower is finer.
Max steps per ray	32 – 20000	700	Upper limit of steps per ray through a volume.
Skip empty space (faster)	on / off	on	Jump through empty air. Leave on.
LIGHT MARCH			
Light steps (0 = cloud's)	0 – 12	0	Steps towards the sun inside a volume. 0 uses the cloud's own setting.
Light march length	0.1 – 8	1.0	How far the sun march reaches, times the deck thickness.
DENSITY GRIDS (ON THE CARD)			
Fine grid voxels (M)	1 – 1024	64	GPU budget of the fine density grid near the camera, million voxels.
Whole-domain voxels (M)	1 – 512	64	GPU budget of the grid covering the whole domain.
Fine grid range (m)	500 – 1e+06	12000	Distance around the camera that gets the fine grid.
Grid quality	0.1 – 8	1.0	Multiplies every cloud's own grid quality.
Density multiplier	0 – 20	1.0	Global density on top of each cloud's own.

Sky and atmosphere



Control	Range	Default	What it does · when to change it
SKY			
Sky follows the sun (sunset, dusk, night)	on / off	on	The sky follows the sun: golden hour, dusk and night come from its height.
Zenith	colour	rgb 18 56 158	Colour straight up (when the sky does not follow the sun).
Horizon	colour	rgb 107 145 201	Colour at the horizon.
Ground	colour	rgb 92 102 87	Colour below the horizon.
Sun glow	0 – 8	1.0	Glow around the sun.
Sun disc size	0 – 20	1.0	Size of the visible sun disc.
ATMOSPHERE			
Haze distance (0 = off)	0 – 1e+08	60000	Distance at which haze reaches 63%. 0 = off.
Haze amount	0 – 1	0.6	Strength of the haze.
LIGHTNING			
Lightning	on / off	off	Lightning in the clouds.
Mode	list	Storm over time (animated)	A storm over time for animation, or a strike in every frame for stills.
Strikes per frame	1 – 12	1	Stills mode: strikes in each frame.
Strikes per minute	0.1 – 600	8	Storm mode: strikes per minute.
Brightness	0 – 50	1.0	Brightness of the bolt and its flash.
Colour	colour	rgb 199 214 255	Bolt colour.
Branches	0 – 1	0.6	0 a single channel, 1 heavily branched.
Reach the ground	0 – 1	0.6	Share of strikes that reach the ground.
Glow in cloud (km)	0.05 – 20	1.5	How far the flash lights the cloud, km.
Ground height	-100000 – 100000	0	World height of the ground.
Seed	0 – 99999	1	Change for a different storm.
Strike tall objects (buildings, masts)	on / off	on	Strikes prefer tall things in the scene.
Tall from (m above ground)	1 – 10000	40	Height above ground that counts as tall.
Slow motion (x)	1 – 100000	1	1 = real time; 1000 lets you watch the leader step down.
Bolt thickness x	0.05 – 20	1	Core width of the bolt.
Zig-zag x	0 – 5	1	How zig-zag each segment is.
Flickers (0 = random)	0 – 12	0	Return strokes per strike. 0 = 2 to 5 at random.
Flicker fade (ms)	2 – 2000	45	Milliseconds each stroke takes to fade.
Afterglow x	0 – 20	1	The glow continuing after the strokes.
Lights the cloud x	0 – 20	1	How much a strike lights the cloud around it.
Halo x	0 – 20	1	Glow around the bolt.

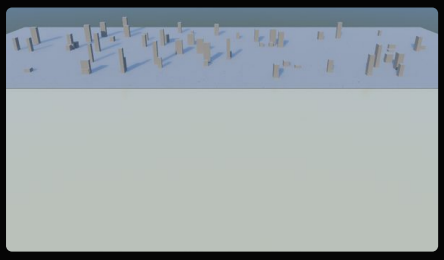
Meshes and lights

Control	Range	Default	What it does · when to change it
MESHES (CITY, LIQUID, ANY GEOMETRY)			
Render meshes	on / off	on	Render polygons: VanguardCity, VanguardLiquid, any geometry. Needs the Vanguard Render licence.
Clouds cast shadows on meshes	on / off	on	Clouds shadow the ground and buildings.
Contact shadows: reach	0 – 100000	25	Contact shadows: how far to look, scene units.
Contact shadows: amount	0 – 1	1	Contact shadow strength. 0 = none.
Reflections	on / off	on	Reflections of the sky and of other meshes.
Max lights light the meshes	on / off	on	Max's own lights (Photometric, VanguardFX Light) light the meshes.
Emission x (lit windows, signs)	0 – 100	1	Multiplies emissive materials: lit windows, signs, screens.
Denoise (final renders)	on / off	on	AI denoiser on final frames (Intel Open Image Denoise).
ENVIRONMENT MAP (HDRI)			
Use Max's environment map	on / off	on	Use Rendering > Environment > Environment Map, usually an HDRI.
Brightness x	0 – 100	1	Brightness of that map.
Rotation (degrees)	-360 – 360	0	Turns the map about the vertical.
Show it behind (background)	on / off	on	Show the map behind. Off shows the sky or background colour while the map still lights.
Sun	list	From the map (aim + strength)	Keep the Vanguard sun, take aim and strength from the map's brightest spot, or use the map alone.

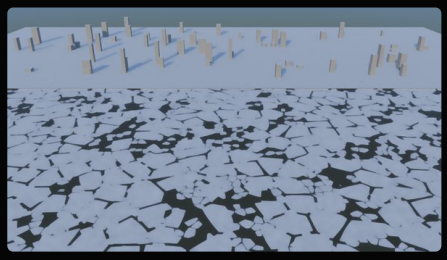
Weather — snow, rain, dirt and ice on every surface



Control	Range	Default	What it does · when to change it
SNOW ON THE SURFACES			
Snow	on / off	off	Snow on every upward surface. No material changes needed.
Amount (0 dusting .. 1 deep)	0 – 1	0.6	0 a dusting, 1 everything that can hold it.
Holds up to slope (deg)	0 – 90	45	Surfaces steeper than this shed the snow.
Slope blend (deg)	0 – 45	12	Blend around that slope.
Patchy (0 even .. 1)	0 – 1	0.5	0 even cover, 1 patchy.
Patch size (m)	0.05 – 1000	6	Size of the patches.
Colour	colour	rgb 235 240 247	Snow colour.
Roughness	0 – 1	0.55	Snow roughness.
Sparkle	0 – 1	0.5	Glints in the sun.
None under roofs and bridges	on / off	on	No snow under roofs, bridges and trees.
Shelter: look up (m)	0.1 – 10000	40	How far up to look for shelter.
Snow line (m above 0)	-100000 – 100000	-100000	No snow below this height.
Snow line blend (m)	0 – 10000	50	Blend above the snow line.
Shore: snow fades in over (m)	0 – 1000	6	Height above water over which snow builds up.
RAIN: WET SURFACES			
Wet	on / off	off	Rain-wet surfaces: darker, glossier, with puddles.
Wetness	0 – 1	0.7	0 damp, 1 soaked.
Puddles	0 – 1	0.4	0 none, 1 standing water on everything flat.
Puddle size (m)	0.05 – 1000	4	Size of the puddles.
DIRT, RUST AND LITTER			
Dirt	on / off	off	A lived-in look on every surface.
Amount (0 clean .. 1 neglected)	0 – 1	0.6	0 clean, 1 neglected.
In corners and recesses	0 – 2	1	Dirt gathered in corners and recesses.
Corner reach (m)	0.05 – 10	0.6	How far from a corner it reaches.
Streaks down the walls	0 – 2	0.6	Rain streaks down the walls.
Pattern size x	0.1 – 10	1	Size of the dirt pattern.
Dirt colour	colour	rgb 41 33 26	Dirt colour.
Rust on metal	0 – 1	0.5	Rust on metal surfaces.
Litter on the ground	0 – 1	0.3	Paper, cans and leaves on the ground.
FREEZE: PACK ICE AND FROST			
Freeze	on / off	off	Pack ice on water and frost on surfaces.
Amount (0 a skin .. 1 frozen solid)	0 – 1	0.8	0 a skin of ice, 1 frozen solid.
Ice floe size (m)	0.5 – 5000	70	Typical ice floe size.
Frost on every surface	0 – 2	0.5	Rime on every surface.


Snow


Wet + puddles


Freeze

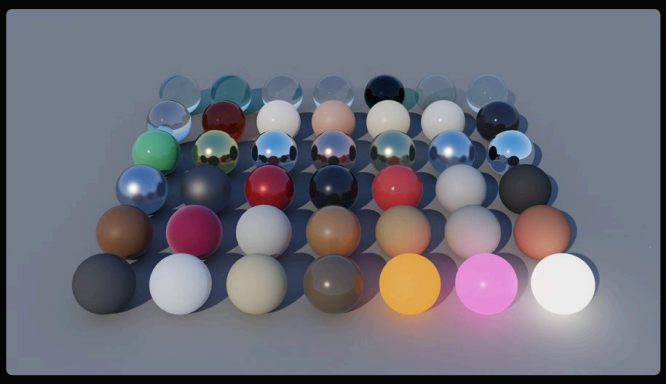
Playback window

Control	Range	Default	What it does · when to change it
PREVIEW			
Resolution (x window)	0.1 – 1	0.5	Fraction of the window size the playback window renders.
Samples per refresh	1 – 64	1	Samples added per refresh.
Grid voxels (M)	1 – 256	12	Grid budget while previewing.
Keep refining when idle	on / off	on	Keep refining while nothing moves.
Refine up to (samples)	1 – 4096	64	Stop refining at this many samples.
Re-bake every N frames	1 – 30	1	Re-bake the clouds every N frames during playback.
Show speed in the title	on / off	on	ms, fps and samples in the window title.
BUTTONS			
Open playback window			Opens the interactive playback window on the active viewport.
Reset every setting to default			Every setting on every page back to its default.

Vanguard Material

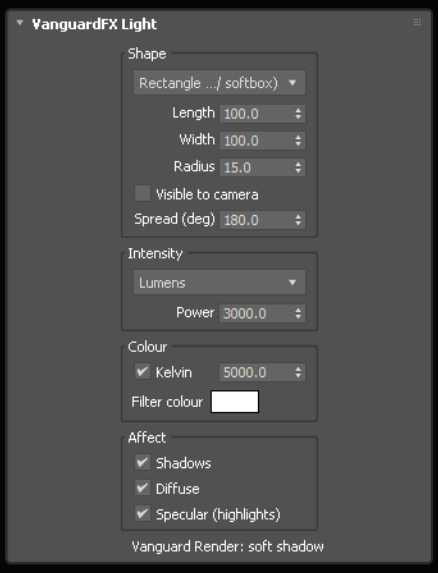
One material for everything. Pick a **Substance** and every value below is set for you; then adjust. *Custom* keeps your own values. Groups: **Base** (colour, roughness, metalness), **Transparency** (amount, colour, IOR, colour depth, thin-walled), **Subsurface**, **Clear coat**, **Sheen**, **Emission** (colour, luminance cd/m², map), **Surface** (bump/normal, cut-out) and **Reflection** (colour, Fresnel IOR, roughness/glossiness, metalness and IOR maps — what V-Ray and Corona materials carry).

Substances: Water, Sea water, Glass (clear, frosted, green bottle), Window pane, Ice, Diamond, Honey, Milk, Skin, Wax, Marble, Jade, Gold, Silver, Copper, Brass, Aluminium, Chrome, Steel, Iron, Car paint, Plastic, Rubber, Leather, Velvet, Cotton, Wood, Concrete, Brick, Asphalt, Snow, Sand, Mud, Lava, Neon sign, Light panel.



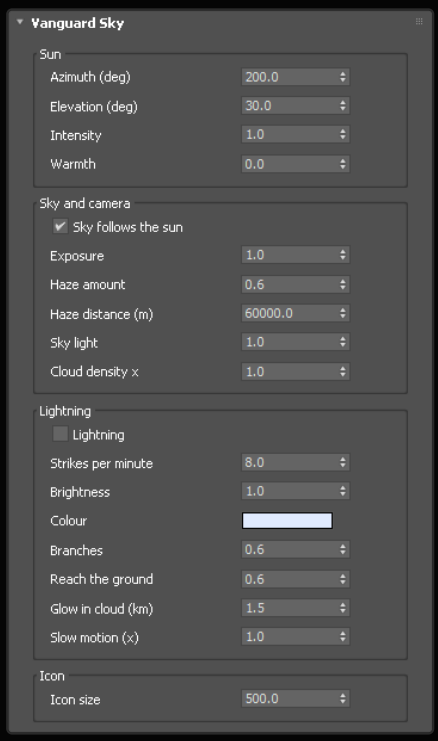
Vanguard Material substances, rendered.

VanguardFX Light



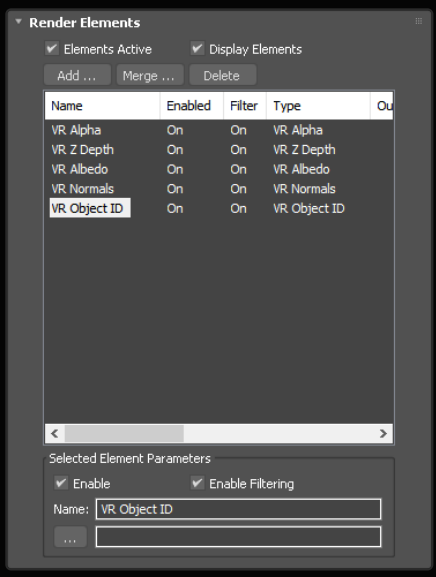
A photometric light with Rectangle, Disc, Sphere and Cylinder shapes, lumens/watts or Kelvin colour, *Visible to camera* and *Spread*. Other renderers see an ordinary photometric light.

Vanguard Sky



A helper that puts sun, sky, exposure, haze and lightning on an object you can animate and copy between scenes.

Render elements



Add > VR ...: Alpha, Clouds Only, Sky, Direct Sun, Skylight GI, Ground Bounce, Haze, Z Depth, Velocity, Thickness, Sun Shadow, Albedo, Normals, Object/Material ID, Reflection, Refraction.

4 Recipes

Golden-hour city

Sun elevation **6°**, warmth **0.6**; Sky follows the sun **on**; haze distance **15000**, amount **0.7**; GI bounces **3**; Dirt **on** 0.4; preset **Production**.

Foggy pier at night

Sun elevation **-8°**; Fog **on**, density **0.03**, forward scatter **0.75**, light beams **2**, billows **0.4**; VanguardFX Lights 3000 lm at **2700 K**.

Winter street

Snow **on**, amount **0.7**, patchy **0.4**, holds up to **40°**; Freeze **on** 0.6 for canals; sun warmth **-0.3**; exposure **0.9**.

Storm over the city

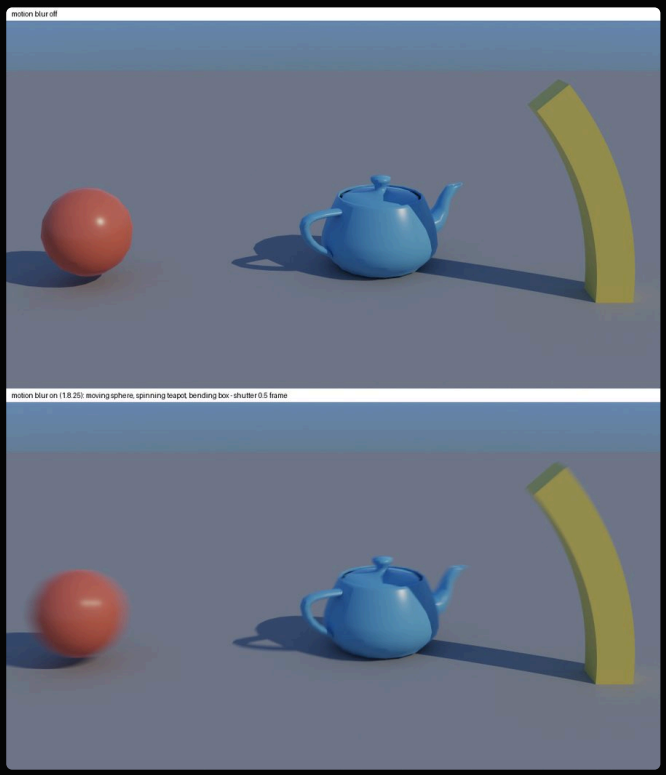
Lightning **on**, storm mode, **12**/min, branches **0.8**, strike tall objects **on**; Wet **on** 0.9, puddles **0.6**; sun intensity **0.3**.

Studio hair / fur close-up

Background **Max background colour** (white); environment map dim at **0.6**, Show it behind **off**; samples **256**, threshold **0.005**, hair bounces **16**, denoise **on**.

5 Rendering & export

- **Renderers.** Vanguard Render renders everything itself. VanguardCloud also exports VDB for Corona, V-Ray and Arnold if you must stay in another renderer.
- **Stills.** Production preset, samples 128–256, adaptive on, threshold 0.01 (0.005 for close-ups), denoise on. A 1920×1080 frame takes 1 to 5 minutes on an RTX 3090.
- **Animation.** Set a **Time limit** so every frame costs the same, motion blur *As the Physical Camera*, and render to EXR sequences.
- **Compositing.** Output colour *Linear*, save 16-bit half EXR, add VR Z Depth, Normals, Albedo and the cloud passes.
- **Network / batch.** Each render node needs its own licence.



Motion blur off / on.

6 Troubleshooting & FAQ

› **"Not enough memory for this scene's geometry."**
The scene (usually millions of hair strands or a huge city) does not fit in the free GPU memory. Close other 3D programs that hold video memory, lower the hair count or render multiplier, or hide heavy objects. Since 1.8.31 dense hair is thinned automatically to fit and drawn wider, instead of crashing.

› **Rendering is on the CPU and slow.**
Quality and speed > Engine shows the card it found. With *Auto* it falls back to the CPU when no NVIDIA card or driver is found, or the card runs out of memory. Update the NVIDIA driver.

› **Meshes are missing — only clouds render.**
Your licence is a VanguardCloud licence, which renders clouds, sky and lightning. Meshes need the Vanguard Render licence. Also check *Render meshes* is on.

› **Grainy hair or fur close-up.**
Use version 1.8.32 or later (hair is denoised), samples 128+, threshold 0.005.

› **The background is grey, not white.**
Set *Background* to *Max background colour* and turn off *Show it behind* on the environment map; the map still lights the scene.

› **Max closed when the Material Editor drew a Vanguard Material swatch.**
Fixed in 1.8.33. Update.

› **"That is your licence key, not your licence file."**
Sign in at vanguardfx.pro > My licences > Download licence file, then press Load file….

› **The image is too bright or burnt out.**
Lower *Exposure*, keep Tone mapping on *Filmic*, or tick *Use Max's exposure control* to match a Physical Camera setup.

› **A new version installed but Max shows the old one.**
Close every Max before installing; the About rollout title shows the running version.

7 Requirements & licence

- 3ds Max **2024, 2025, 2026 or 2027**, Windows 10/11 64-bit.
- **NVIDIA GPU** with CUDA, 8 GB or more recommended (24 GB for heavy hair and cities). CPU rendering works without one, slower.
- 16 GB RAM minimum, 32–64 GB for large scenes.
- **One licence, one computer** — tied to the Hardware ID. Moving to a new PC: contact support.
- Plans and prices on vanguardfx.pro/render.html.
- Support: **support@vanguardfx.pro** — include the About rollout's version line and your scene's hair or polygon count.

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