8-Bit vs 10-Bit Encoding — Decision Cheat Sheet

When 10-bit pays off, when 8-bit is fine. Updated for 2026.

> **Default in 2026: 10-bit.**
> 5–12% smaller files at the same perceptual quality; banding on smooth gradients goes away.

When 10-bit is the right call

- HDR delivery (HDR10, HDR10+, Dolby Vision, HLG) — spec-mandated.
- SDR streaming where you own the pipeline (OTT, AVOD, SVOD, e-learning).
- Surveillance, telemedicine, and AR/VR — banding hides diagnostic detail.
- Premium AV1 tier (matches Netflix's choice — AV1 10-bit on SDR since 2020).
- Any catalogue large enough that 5–12% CDN savings cover the encode budget.

When 8-bit is fine (or required)

- YouTube SDR uploads — platform truncates 10-bit on ingest to 8-bit BT.709.
- WebRTC real-time / low-latency, where 10-bit HW profiles are still thin.
- Sub-500 kbps ladders — per-pixel overhead may eat the precision win.
- Legacy device tail that lacks 10-bit HEVC / AV1 Main 10 decode in HW.

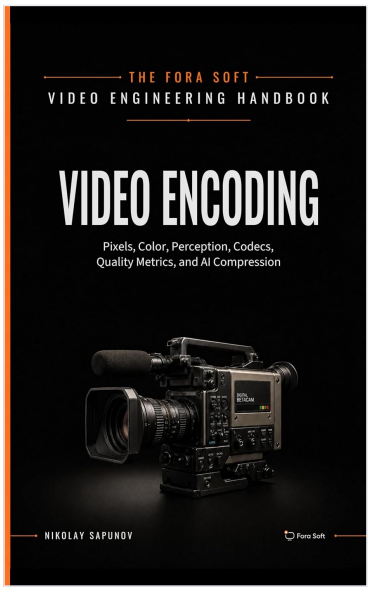
Encoder flags (10-bit pipeline)

Encoder	10-bit flag	Notes
x264	`--profile high10 --output-csp i420`	Use 10-bit build
x265	`--profile main10 --output-depth 10`	Internal math is 10-bit either way
SVT-AV1	`--input-depth 10 --profile 0`	Native 10-bit ladder
libvpx-vp9	`--profile=2 --bit-depth=10`	VP9 Profile 2
VideoToolbox	`kVTProfileLevel_HEVC_Main10_AutoLevel`	Apple Silicon, full HW
NVENC	`-preset p5 -pix_fmt p010le -profile main10`	Turing+; 30–50% throughput dip on older silicon
QuickSync	`-pix_fmt p010le -profile:v main10`	Gen11+; Arc class supports AV1 10-bit

2026 device-support floor (10-bit HW decode)

- **HEVC Main10:** broad — Apple A12+/M-series, Android flagships since 2018, smart TVs since ~2017.
- **AV1 Main 10:** Apple A17/M3+ (universal in 2025 line), Android flagships since 2021, mid-range from 2023.
- **VP9 Profile 2:** legacy, broad on Android/ChromeOS; new pipelines should prefer AV1 instead.
- **Long-tail share** without 10-bit decode in 2026: 3–7% globally; keep an 8-bit fallback ladder.

> **Rule of thumb**
> Default 10-bit. Ship an 8-bit fallback for legacy. Skip 10-bit only if the platform truncates or HW penalty > 30%.



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Video Encoding: A Complete Guide to Video Compression

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This cheat sheet settles the 8-bit vs 10-bit call on one page: when 10-bit pays off, the encoder flags and the 2026 decode floor. Volume 1 explains why it works: how sample precision causes or removes banding, the Main 10 profiles of H.264, HEVC and AV1, HDR transfer functions, and the quality metrics that show the difference.

WHAT YOU WILL FIND INSIDE

- Bit depth, banding and why 10-bit compresses better
- HDR10, HLG and Dolby Vision signalling
- Quality metrics that catch banding before viewers do
- Main 10 profiles in H.264, HEVC, AV1 and VP9
- Rate control and ladders for 10-bit delivery

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Deciding whether your catalog should move to 10-bit encoding?

We will check your device mix and bitrate ladder, then show where 10-bit saves CDN money and what the 8-bit fallback costs. 250+ video products shipped since 2005.

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