Quantization tuning — cheat sheet

QP scale, anchor points, matrices, dependent and adaptive Q across H.264, HEVC, VP9, AV1, VVC

Companion to article 4.8 of Block 4. Print on A4. Fora Soft - 2026

1. QP anchor points (H.264 / HEVC / VVC scale)

QP	Qstep	Use it for	AV1 qindex equivalent
4	1.0	Lossless / mastering	~0 - 20
16	4.0	Archival, post-production proxies	~60 - 80
22	8.0	Transparent quality (premium VOD)	~88 - 100
28	16.0	Good quality (mid-tier OTT)	~110 - 130
33	26.9	Watchable on small screens	~140 - 160
38	50.8	Visibly soft / artefacts likely	~170 - 200
46	128.0	Last resort, severe bandwidth limit	~220 - 240

2. Quantization features by codec

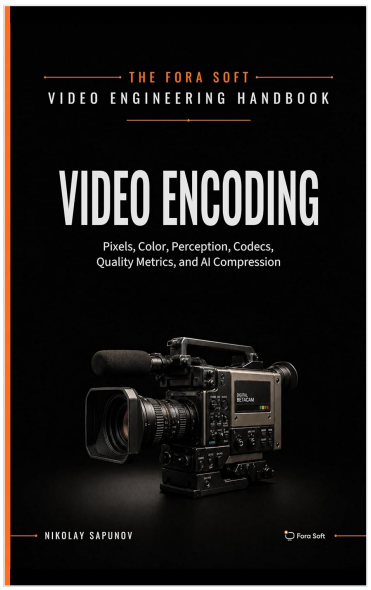
Codec	Scale	Matrix	Dependent Q	Adaptive Q tooling
H.264 / AVC	0 - 51	Default + custom	No	x264 aq-mode, mb-tree
HEVC / H.265	0 - 51 / 63	Default + custom + delta	No	x265 aq-mode, mb-tree
VP9	0 - 255 qindex	Flat only	No	libvpx aq-mode
AV1	0 - 255 qindex	Built-in set	No	Built-in segments, libaom/SVT-AV1
VVC / H.266	0 - 63 / 75	Default + custom + LFNST	Yes (default)	Encoder-side, tools-aware

3. Tuning recipes by workload

Workload	QP / CRF anchor	Quantization settings
VOD premium 4K	HEVC CRF 21	Custom matrix on intra; aq-mode=2; mb-tree on
Live OTT 1080p	HEVC CRF 25	Default matrix; aq-mode=1; mb-tree on; tune zerolatency
WebRTC SFU	H.264 QP 28 base	Flat matrix; aq-mode=1; psy-rd 0.6; low motion search
Surveillance VOD	HEVC CRF 27	Default matrix; aq-mode=2; reduce delta-QP range
Animation	x265 CRF 19	Custom matrix; psy-rd 0.4 - 0.6; mb-tree on
Screen content	AV1 q 32 base	Built-in matrix; large seg-aq; tune ssim

4. Pitfalls to avoid

- Confusing CRF numbers across encoders: x264 CRF 23 != x265 CRF 23 != AV1 CRF 23. Always re-tune.
- Disabling dependent quantization on VVC for 'simplicity'. The 3 - 5 % bitrate win pays for itself.
- Shipping flat matrices on smooth content like sky or face. Banding will appear by QP 28.
- Cranking aq-strength without testing - over-aggressive AQ wastes bits on low-saliency texture.
- Treating banding as a quantization issue when the source is already 8-bit. Encode in 10-bit.
- Ignoring per-plane qindex offsets in AV1. Chroma noise on faces is often a chroma-QP issue.



GO DEEPER · VOLUME 1 OF 7

Video Encoding: A Complete Guide to Video Compression

From Pixels and Color to H.264, HEVC, AV1, Quality Metrics, and AI

By Nikolay Sapunov, CEO at Fora Soft · 1,522 pages · Kindle & paperback on Amazon

Read it on Amazon → amazon.com/dp/B0HF52B65R

This sheet gives you QP anchors, codec-by-codec quantization features and tuning recipes per workload. Volume 1 goes deeper into where quality is lost: transforms and quantization matrices, adaptive and dependent quantization, rate control that drives QP, and how banding and artefacts show up in the metrics.

WHAT YOU WILL FIND INSIDE

- Transforms, QP and quantization matrices
- Adaptive and dependent quantization across codecs
- Rate control: how CRF and VBR drive QP
- Banding, 10-bit encoding and perceptual tuning

THE FULL HANDBOOK · 7 VOLUMES · 9,000+ PAGES · ALL ON AMAZON

Vol. 1 · Video Encoding — pixels and color to H.264, HEVC, AV1, quality metrics and AI
Vol. 2 · Video Streaming I — network transport, contribution and ingest, HLS, MPEG-DASH, CMAF
Vol. 3 · Video Streaming II — ABR, CDNs, players, WebRTC, DRM and the economics of delivery
Vol. 4 · Audio for Video I — PCM, codecs, loudness, accessibility, real-time voice processing
Vol. 5 · Audio for Video II — jitter buffers, lip sync, Atmos, quality metrics, neural codecs
Vol. 6 · AI for Video I — models and inference, computer vision, speech, search, generative video
Vol. 7 · AI for Video II — real-time pipelines, agents, serving, cost, compliance, verticals

Fighting banding or bitrate waste at the same visual quality?

We will tune QP, matrices and AQ for your content types and show the bitrate saved at equal VMAF on your own titles. 250+ video products shipped since 2005.

Book a 30-min call → **WhatsApp →** **Email us →**