

BRIGHTLUX

Refresh Rate & Camera Guide

Eliminating Flicker, Banding & Moire in LED Displays

A guide for specifying LED displays that look perfect on camera - critical for broadcast, social media content, and any space where visitors photograph or film.

WHY REFRESH RATE MATTERS

Refresh rate (measured in Hz) determines how many times per second the display redraws. Low refresh rates cause visible flicker and horizontal scan lines when viewed through cameras.

- Human eye: flicker visible below ~60Hz
- Phone cameras: banding visible below ~1,920Hz
- Professional cameras: artefacts visible below ~3,840Hz
- Slow-motion cameras: require 7,680Hz+

REFRESH RATE BY APPLICATION

Application	Min Refresh	Recommended	Why
Office / internal use	1,920 Hz	3,840 Hz	Staff may photograph
Retail / public	3,840 Hz	3,840 Hz	Customers film constantly
Hotel lobby / F&B	3,840 Hz	3,840 Hz	Social media photos
Broadcast studio	3,840 Hz	7,680 Hz	Professional cameras
Event/stage (live)	3,840 Hz	7,680 Hz	Broadcast + phones
Museum / gallery	3,840 Hz	3,840 Hz	Visitor photography
Outdoor advertising	1,920 Hz	3,840 Hz	Camera distance helps

MOIRE PATTERN PREVENTION

Moire patterns (wavy interference lines) appear when a camera's sensor grid interferes with the LED pixel grid. Prevention strategies:

- Higher refresh rate is the primary solution
- COB/MiP panels with smooth surfaces produce less moire than SMD
- Smaller pixel pitch reduces moire visibility on camera
- Anti-moire diffuser films can be applied (slight brightness reduction)
- Processing systems like Novastar and Brompton have anti-moire settings

GREYSCALE & BIT DEPTH

Bit depth determines how many brightness levels each colour channel can display. Higher bit depth = smoother gradients, no banding.

Bit Depth	Greyscale Levels	Colours	Use Case
14-bit	16,384 per channel	4.4 trillion	Standard indoor
16-bit	65,536 per channel	281 trillion	Premium / broadcast
18-bit	262,144 per channel	~18 quadrillion	Ultra-premium / medical

BRIGHTLUX | Premium LED Display Solutions

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