

Frame-rate relationships

Declare the picture rate, counting convention and conversion policy before comparing numbers.

Exact rates and label counts

Rate label	Exact fps	Nominal N	DF skips*
23.976	24000/1001	24	Not offered
24 / 25 / 30	24 / 25 / 30	24 / 25 / 30	Not offered
29.97	30000/1001	30	2
48 / 50 / 60	48 / 50 / 60	48 / 50 / 60	Not offered
59.94	60000/1001	60	4

Frame-preserving conforms

Change	Frames	Source to new seconds	Speed
24 to 25	1440	60.000 to 57.600	104.1667%
24 to 23.976	1440	60.000 to 60.060	99.9001%
25 to 29.97	1500	60.000 to 50.050	119.8801%
48 to 24	1440	30.000 to 60.000	50.0000%

Counting and interpretation

- * DF skips opening labels at each minute except every tenth minute; no pictures are removed. At 29.97: 00:00:59;29 -> 00:01:00;02.
At full-rate 59.94: 00:00:59;59 -> 00:01:00;04.

- Elapsed seconds = frame count / exact fps. NDF label seconds at a fractional rate are not physical elapsed seconds.

- Speed ratio = playback rate / source rate. Duration ratio is its reciprocal. These conforms retain all source frames; a duration-preserving standards conversion needs a different picture policy.

- 1080i/59.94 commonly denotes 59.94 fields and 29.97 frames per second; 1080p/59.94 denotes 59.94 whole frames. PsF divides one progressive picture into two segments. Confirm the delivery notation.

Full-rate 59.94 labels are the convention used here, not a universal HFR transport encoding. Decimal results are rounded.

Primary references

[Apple TN2310: timecode counting](#)

[ITU-R BT.709-6: HDTV image formats](#)

Native calculator: [Mac](#) / [iPhone](#) and [iPad](#). Separate purchases.