List of True 16:9 Resolutions

2015-10-13
Updated to include full range of resolutions up to 8K UHDTV.

In an effort to enhance the knowledge of the video-making community, I have compiled a list of all true 16:9 video resolutions, including their associated standard when applicable, as well as when the resolution is divisible by 8, which is useful for limited video encoders. The table goes up to 1080p and includes common resolutions like that of a typical 27 inch 16:9 computer monitor and Super Hi-Vision.

Note: If you've ever worked with SD content, you'll notice that no resolution here fits the DVD standard. That's because DVDs were originally made to comply with the NTSC broadcasting resolution, which is a non-square pixel standard using the resolution of 720 by 480 pixels, stretched to accommodate either 4:3 or 16:9 content, never producing a true 16:9 resolution.

Width	Height	Common names and standards	Divisible by 8
16	9		
32	18		
48	27		
64	36		
80	45		
96	54		
112	63		

128	72		Yes
144	81		
160	90		
176	99		
192	108		
208	117		
224	126		
240	135		
256	144		Yes
272	153		
288	162		
304	171		
320	180		
336	189		
352	198		
368	207		
384	216		Yes
400	225		
416	234		
432	243		
448	252		
464	261		
480	270		
496	279		

512	288		Yes
528	297		
544	306		
560	315		
576	324		
592	333		
608	342		
624	351		
640	360		Yes
656	369		
672	378		
688	387		
704	396		
720	405		
736	414		
752	423		
768	432		Yes
784	441		
800	450		
816	459		
832	468		
848	477		
864	486		
880	495		

896	504		Yes
912	513		
928	522		
944	531		
960	540		
976	549		
992	558		
1008	567		
1024	576		Yes
1040	585		
1056	594		
1072	603		
1088	612		
1104	621		
1120	630		
1136	639		
1152	648		Yes
1168	657		
1184	666		
1200	675		
1216	684		
1232	693		
1248	702		
1264	711		

1280	720	720p / HD ready	Yes
1296	729		
1312	738		
1328	747		
1344	756		
1360	765		
1376	774		
1392	783		
1408	792		Yes
1424	801		
1440	810		
1456	819		
1472	828		
1488	837		
1504	846		
1520	855		
1536	864		Yes
1552	873		
1568	882		
1584	891		
1600	900		
1616	909		
1632	918		
1648	927		

1664	936		Yes
1680	945		
1696	954		
1712	963		
1728	972		
1744	981		
1760	990		
1776	999		
1792	1008		Yes
1808	1017		
1824	1026		
1840	1035		
1856	1044		
1872	1053		
1888	1062		
1904	1071		
1920	1080	1080p / Full HD / BT.709	Yes
1936	1089		
1952	1098		
1968	1107		
1984	1116		
2000	1125		
2016	1134		

2032	1143		
2048	1152		Yes
2064	1161		
2080	1170		
2096	1179		
2112	1188		
2128	1197		
2144	1206		
2160	1215		
2176	1224		Yes
2192	1233		
2208	1242		
2224	1251		
2240	1260		
2256	1269		
2272	1278		
2288	1287		
2304	1296		Yes
2320	1305		
2336	1314		
2352	1323		
2368	1332		
2384	1341		
2400	1350		

2416	1359		
2432	1368		Yes
2448	1377		
2464	1386		
2480	1395		
2496	1404		
2512	1413		
2528	1422		
2544	1431		
2560	1440	WQHD	Yes
2576	1449		
2592	1458		
2608	1467		
2624	1476		
2640	1485		
2656	1494		
2672	1503		
2688	1512		Yes
2704	1521		
2720	1530		
2736	1539		
2752	1548		
2768	1557		
2784	1566		

2800	1575		
2816	1584		Yes
2832	1593		
2848	1602		
2864	1611		
2880	1620		
2896	1629		
2912	1638		
2928	1647		
2944	1656		Yes
2960	1665		
2976	1674		
2992	1683		
3008	1692		
3024	1701		
3040	1710		
3056	1719		
3072	1728		Yes
3088	1737		
3104	1746		
3120	1755		
3136	1764		
3152	1773		
3168	1782		

3184	1791		
3200	1800		Yes
3216	1809		
3232	1818		
3248	1827		
3264	1836		
3280	1845		
3296	1854		
3312	1863		
3328	1872		Yes
3344	1881		
3360	1890		
3376	1899		
3392	1908		
3408	1917		
3424	1926		
3440	1935		
3456	1944		Yes
3472	1953		
3488	1962		
3504	1971		
3520	1980		
3536	1989		
3552	1998		

3568	2007		
3584	2016		Yes
3600	2025		
3616	2034		
3632	2043		
3648	2052		
3664	2061		
3680	2070		
3696	2079		
3712	2088		Yes
3728	2097		
3744	2106		
3760	2115		
3776	2124		
3792	2133		
3808	2142		
3824	2151		
3840	2160	4K UHD / UHDTV1 / BT.2020	Yes
3856	2169		
3872	2178		
3888	2187		
3904	2196		
3920	2205		

3936	2214		
3952	2223		
3968	2232		Yes
3984	2241		
4000	2250		
4016	2259		
4032	2268		
4048	2277		
4064	2286		
4080	2295		
4096	2304		Yes
4112	2313		
4128	2322		
4144	2331		
4160	2340		
4176	2349		
4192	2358		
4208	2367		
4224	2376		Yes
4240	2385		
4256	2394		
4272	2403		
4288	2412		
4304	2421		

4320	2430		
4336	2439		
4352	2448		Yes
4368	2457		
4384	2466		
4400	2475		
4416	2484		
4432	2493		
4448	2502		
4464	2511		
4480	2520		Yes
4496	2529		
4512	2538		
4528	2547		
4544	2556		
4560	2565		
4576	2574		
4592	2583		
4608	2592		Yes
4624	2601		
4640	2610		
4656	2619		
4672	2628		
4688	2637		

4704	2646		
4720	2655		
4736	2664		Yes
4752	2673		
4768	2682		
4784	2691		
4800	2700		
4816	2709		
4832	2718		
4848	2727		
4864	2736		Yes
4880	2745		
4896	2754		
4912	2763		
4928	2772		
4944	2781		
4960	2790		
4976	2799		
4992	2808		Yes
5008	2817		
5024	2826		
5040	2835		
5056	2844		
5072	2853		

5088	2862		
5104	2871		
5120	2880	Retina 5K	Yes
5136	2889		
5152	2898		
5168	2907		
5184	2916		
5200	2925		
5216	2934		
5232	2943		
5248	2952		Yes
5264	2961		
5280	2970		
5296	2979		
5312	2988		
5328	2997		
5344	3006		
5360	3015		
5376	3024		Yes
5392	3033		
5408	3042		
5424	3051		
5440	3060		
5456	3069		

5472	3078		
5488	3087		
5504	3096		Yes
5520	3105		
5536	3114		
5552	3123		
5568	3132		
5584	3141		
5600	3150		
5616	3159		
5632	3168		Yes
5648	3177		
5664	3186		
5680	3195		
5696	3204		
5712	3213		
5728	3222		
5744	3231		
5760	3240		Yes
5776	3249		
5792	3258		
5808	3267		
5824	3276		
5840	3285		

5856	3294		
5872	3303		
5888	3312		Yes
5904	3321		
5920	3330		
5936	3339		
5952	3348		
5968	3357		
5984	3366		
6000	3375		
6016	3384		Yes
6032	3393		
6048	3402		
6064	3411		
6080	3420		
6096	3429		
6112	3438		
6128	3447		
6144	3456		Yes
6160	3465		
6176	3474		
6192	3483		
6208	3492		
6224	3501		

6240	3510		
6256	3519		
6272	3528		Yes
6288	3537		
6304	3546		
6320	3555		
6336	3564		
6352	3573		
6368	3582		
6384	3591		
6400	3600		Yes
6416	3609		
6432	3618		
6448	3627		
6464	3636		
6480	3645		
6496	3654		
6512	3663		
6528	3672		Yes
6544	3681		
6560	3690		
6576	3699		
6592	3708		
6608	3717		

6624	3726		
6640	3735		
6656	3744		Yes
6672	3753		
6688	3762		
6704	3771		
6720	3780		
6736	3789		
6752	3798		
6768	3807		
6784	3816		Yes
6800	3825		
6816	3834		
6832	3843		
6848	3852		
6864	3861		
6880	3870		
6896	3879		
6912	3888		Yes
6928	3897		
6944	3906		
6960	3915		
6976	3924		
6992	3933		

7008	3942		
7024	3951		
7040	3960		Yes
7056	3969		
7072	3978		
7088	3987		
7104	3996		
7120	4005		
7136	4014		
7152	4023		
7168	4032		Yes
7184	4041		
7200	4050		
7216	4059		
7232	4068		
7248	4077		
7264	4086		
7280	4095		
7296	4104		Yes
7312	4113		
7328	4122		
7344	4131		
7360	4140		
7376	4149		

7392	4158		
7408	4167		
7424	4176		Yes
7440	4185		
7456	4194		
7472	4203		
7488	4212		
7504	4221		
7520	4230		
7536	4239		
7552	4248		Yes
7568	4257		
7584	4266		
7600	4275		
7616	4284		
7632	4293		
7648	4302		
7664	4311		
7680	4320	8K UHD / UHDTV2 / Super Hi-Vision / BT.2020	Yes

Pacoup / June 12, 2011 / Video / featured

125 thoughts on “List of True 16:9 Resolutions”

Md. Ashaduzzaman

October 13, 2019 at 05:59

very good information.

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tms

October 18, 2019 at 16:27

thanks just what i needed

IMGAlone

November 15, 2019 at 04:03

I just signed in to thank you for taking the time and making this. I find it extremely useful and I keep it open in a browser tab at all times.

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alex

November 27, 2019 at 11:26

Thank you for this information

Ahmet Sali

December 6, 2019 at 13:57

thanks for sharing this

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essaund

December 20, 2019 at 03:38

This conversions of 16:9 aspect ratio really helped. I'm building a video tube and I do want to have quality videos without compromising on file size since most

internet users are on metered connections. Thanks so much.

Dracken

December 21, 2019 at 08:43

Thanks very much, I check this always again and again for fitting images to 16:9 to enjoy them in fullscreen.
This helps really ☺

redguy

January 1, 2020 at 10:14

How is 1600 x 900 not a 16:9 ratio?

Pacoup

January 1, 2020 at 17:52

It is, it’s just not divisible by 8, which rarely matters anymore in modern encoders though.

Nathan Parkin

January 11, 2020 at 14:17

my thanks dude awesome information and on point !
thanks much

Mr. Jem

January 29, 2020 at 11:36

Valiosa y útil información.
Gracias!!

Matt

April 27, 2020 at 07:12

For 2560 x 1440, you have “27 inch monitor” written in the Standard column. The standard should be WQHD.

Pacoup ▪

April 27, 2020 at 10:07

Yes, you’re right. Not much of a standard. I’ve changed it to WQHD and added some other names.

Lawrence

June 25, 2020 at 15:14

Very good list.

When I need to set some window size (and position) to match the 16:9 aspect ratio, I always use this free windows app, “sizer” – http://www.brianapps.net/sizer4

ineuw

July 5, 2020 at 16:07

My goto list of reference since I found the original post many years ago. Thank you.

Andrew Church

November 27, 2020 at 20:40

not blocks of 16 x 16 the ideal?

Did bit of work with internet radio/tv back in 2000s, from a radio background i absorbed absorbed video bits, H.264 for PS + Apple adopted, I was telling people bout it 2004, given processor and storage limitations, I used

512 x 288 for personal copies,

I'd swear for sure H.264 optimal with both sides wholey divisible by 16, and it was best to adjust the height to a 16 multiple over strict adherence to 16:9, most likey my memory is wrong, because ALL memory is wrong, at least incomplete.

Was there anything about 16×16 back then? OH, I guessed, never confirmed, 16×16 had to do a super efficient scaler for compression, 2 squared and (2 squared) squared, 2 orders of magnitude from an area of 256 to 2

Pacoup

December 7, 2020 at 23:29

Well, the only reason I added the 8×8 highlights is because back when I made this list, the ffmpeg-based GUI encoder I was using would only work with resolutions that were multiples of 8, perhaps an artifact of H.261 having fixed size 8×8 transform blocks, or an attempt at following common resolutions: https://www.reddit.com/r/askscience/comments/8ixs5p/why_are_the_most_common_screen_resolutions/

In terms of not adhering to 16:9 resolutions, it's possible you're thinking of the D-1 SMPTE digital recording video standard, which used non-square pixels to represent NSTC (720×480) and PAL (720×576), both resolutions adopted by the DVD standard, staying the same whether the image was 4:3 or 16:9.

These are indeed divisible by 16, and 16×16 is the maximum macroblock size for most MPEG family codecs, so this would indeed maximize compression efficiency because larger macroblocks allow for better compression of larger images. For example, HEVC replaced macroblocks with coding tree units (CTUs) that can support samples up to 64×64 to more efficiently code large images in 4K video.

720×480 and 720×576 don't come from there, but 16×16 probably does.

480 and 576 come from the luma sampling rate adopted by the industry when converting analog video into digital, which itself comes from the nature of analog NSTC and PAL signals which included a vertical blanking interval so you wouldn't see the retrace on old TV sets. "This blanking interval was originally designed to simply blank the electron beam of the receiver's CRT to allow for the simple analog circuits and slow vertical retrace of early TV receivers.": https://en.wikipedia.org/wiki/NTSC#Technical_details

Effectively, NTSC had 525 lines of content per frame, with 483 visible and later 480 visible, and PAL had 625 lines per frame with 576 visible:
https://en.wikipedia.org/wiki/480i
https://en.wikipedia.org/wiki/576i

Then, to fit a 4:3 480 line picture according to the Rec. 601 sampling rate, you would end up with 704 pixels wide, which was bumped up to 720 pixels to account for inconsistent widths of analog NTSC and PAL motion pictures:
https://en.wikipedia.org/wiki/Pixel_aspect_ratio#Background

So, 16×16 being the largest multiple-of-2 macroblock that can divide digital NTSC and PAL resolutions cleanly may have been a factor in the design of H.261 which used macroblocks to address compression limitations in the non-DCT-based H.120 (H.261 luma samples were 16×16):
https://en.wikipedia.org/wiki/H.120
https://en.wikipedia.org/wiki/H.261

Nowadays, you should probably just use standard 720p and up. This article was originally meant as a way to identify useful square pixel resolutions for digital NSTC 16:9 content for the web, because 480p would be 853.333… px wide in 16:9, and neither 853 nor 854 would work in that encoder, and I didn't want to settle for 360p.

Kazuki

February 7, 2021 at 12:50

Thanks, simple but effective

Monty

March 25, 2021 at 13:34

I've needed this page for so many times, so thank you so much

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link6790

May 6, 2021 at 11:55

So there is no real 16:9 resolution for my 3840×1600 monitor to use when a game doesn't support ultrawide. This explains why the highest 16:9 option I get is 2560×1440.

Kuranghi

January 2, 2022 at 16:31

Is there a way I can send you something for a coffee/beer?

Jay

February 12, 2022 at 11:14

What's the best resolution to dowscale to 720p? Like how 864p is the best downscale for 1440p.

Pacoup •

February 19, 2022 at 20:35

I'm don't know how 864p is the best downscale for 1440p... it's not a factor of 2, but unless you're doing nearest neighbor scaling for whatever reason, e.g. scaling pixel art, it shouldn't matter with any decent scaling algorithm. What exactly are you looking to do here?

Searcher

June 20, 2022 at 15:21

June 20, 2022
Hi – I'm researching DVD ripping/conversion to digital outputs, looking for resolutions that will yield good results, balancing storage size requirements vs. quality of output on digital players, computer moniters, and built-in TV upscalers.

I came across your list here, and it is helpful. The products I've been testing with so far are the current versions of WinX DVD Ripper – Platinum, and WonderFox DVD Video Converter (also rips DVDs). Wonderfox offers an h265 encoder (for excellent compression) and a drop-down list with many selectable resolution values, one of which is 960 x 640. This resolution seems to meet your "true 16:9" and divisible by 8 criteria.

I'm test-ripping DVDs from a variety of manufacturers, and in many Widescreen formats (Widescreen, enhanced for Widescreen TVs; 1.85:1; Letterbox; 2.35:1 enhanced for 16×9 TVs, etc.). I'm reviewing my outputs on a 27" ASUS monitor at 2560 x 1440, and on an LG 60" 4k UHD tv (which has its own built-in upscaler), and the outputs look good (to me, anyway).

Looking forward (given TV industry technology directions), would you see any "downside" issues with ripping/converting DVDs to a resolution of 960 x 640, for playing on any screen-size up to 60" diameter? I, like many others these days, have a large collection of DVDs (about 1,000) I'd like to digitize, so I'm hoping to find a resolution with a good balance between storage size and viewing quality that would allow my digital library of converted DVDs to be functional for many future years, without requiring a massive amount of terabyte drives (one set for primary/usage, and one set for backup).

Thanks to all for any thoughts you might care to share on this.

Pacoup

June 29, 2022 at 17:01

Technically, widescreen DVD-Video is non-square pixels in D-1 format, so 720×576 for PAL/SECAM, and 720×480 for NTSC, so I prefer to keep the original resolution and apply the correct aspect ratio, through, for example, the MKV metadata, although not all players support this.

A lot of DVD sources, however, are garbage, so you may actually wish to apply high quality filters and crops during the encoding process instead, using square pixels. In this case, you do anything you want, really, so long as you aren't accidentally downscaling, e.g. 896×504 for 720×576 PAL content.

If you are looking to encode the content for TV upscalers, however, it might be best to keep the format as original as possible, including interlacing, so that the TV may use its hardware upscalers and deinterlacers as designed for DVD content. Whether that works in practice with ripped content is something you'll have to test with your own particular setup and players. Same for whether the result will be superior.