

Minimum Resolution Required for Various Size Prints If Viewed By an Observer with 20-20 Vision													
Print Size		4" x 6"	5" x 7"	8" x 10"	8½" x 11"	11" x 14"	11" x 17"	12" x 18"	13" x 19"	16" x 20"	17" x 22"	20" x 30"	24" x 36"
Standard Viewing Distance		7"	9"	13"	14"	18"	20"	22"	23"	26"	28"	36"	43"
At 18" (Pixel Peeping)†	Dimensions (pixels)	764 1146	955 1337	1528 1910	1624 2101	2101 2674	2101 3247	2292 3438	2483 3629	3056 3820	3247 4202	3820 5730	4584 6876
	Megapixels	0.9	1.3	2.9	3.4	5.6	6.8	7.9	9.0	11.7	13.6	21.9	31.5
At 28" (Arms Length)‡	Dimensions (pixels)	492 738	615 861	984 1230	1046 1353	1353 1722	1353 2091	1476 2214	1599 2337	1968 2460	2091 2706	2460 3690	2952 4428
	Megapixels	0.4	0.5	1.2	1.4	2.3	2.8	3.3	3.7	4.8	5.7	9.1	13.1
	Minimum DPI Required	430	382	265	246	191	172	157	150	133	123	96	80
At Standard Viewing Distance (defined as equal to the diagonal size of the print)	Dimensions (pixels)	1720 2580	1910 2674	2120 2650	2091 2706	2101 2674	1892 2924	1884 2826	1950 2850	2128 2660	2091 2706	1920 2880	1920 2880
	Megapixels	4.4	5.1	5.6	5.7	5.6	5.5	5.3	5.6	5.7	5.7	5.5	5.5
† Minimum 191 DPI required													
‡ Minimum 123 DPI required													

How to Use this Chart

Find the size of the print that you are preparing.

Check the Standard Viewing Distance ... this tells you at what distance the print should be viewed.

Assuming the person viewing the print has 20-20 vision (normal visual acuity), the required minimum pixel dimensions required for the print size chosen can be read for 18" (often called "pixel peeping", 28" (comfortable arms length viewing) or at the previously mentioned "standard viewing distance", along with the size of the file in megapixels that has these dimensions. In addition, the required print resolution for viewing at "standard viewing distance" is shown (the resolution for 18" is 191 dpi and for 28" is 123 dpi). Prints with a resolution less than the minimum will have noticeably reduced quality to viewers with standard 20-20 vision or better.

Example:

Blackstone is going to make a 11" x 17" print for his friend Vic as a birthday present. Vic has good vision, which Blackstone suspects is 20-20. Blackstone knows that Vic will look very closely at the print when he receives it, as he is an well-known "pixel peeper". Blackstone finds the column marked "11 x 17" and follows it down to the row marked "At 18" (Pixel Peeping)". He finds that the minimum dimensions of the print he is preparing should be 2101 x 3247 at a minimum resolution of 191 dpi if Vic is going to be happy when he does "his thing".

Notes and Points of Interest:

1. Assuming the observer has 20-20 vision or worse, it is interesting that at "Standard Viewing Distance" the maximum required resolution of any size print 24" x 36" or smaller, is well within the capabilities of almost all digital cameras, including point and shoots. Even viewed as close as 28", or so-called "arm's length", prints 20" x 30" or smaller are easily within the capabilities of these cameras (the size drops to 16" x 20" at 18"). This means the megapixel specifications of a camera, taken in isolation, have almost no importance.
2. Assuming a print is viewed at a distance of 18" or more, printing resolutions greater than 200 dpi are unnecessary, unless the observer has extraordinary visual acuity.
3. People with extraordinary visual acuity (20-15 or 20-10) can see more clearly, and for them, the dimensions and therefore resolution required for the same degree of perception of sharpness is higher. Perfect visual acuity is approximately 20-8, and is limited by diffraction caused by the pupil opening (some birds of prey are believed to approach 20-2).