Pixels per Scanned Sheet Image: Uncompressed and Compressed

Number of Pixels Needed to Represent Standard Size Sheets of Paper Using Customary Scan Resolutions

Paper Sheet Sizes in (New) US Customary Measure							Paper Sheet Sizes in Metric Measure							Compression			
Paper Size Name	Dots per Inch	Size in Inches H	V	Size in Pixels H	V	Total Number of Pixels	Paper Size Name	Dots per mm	Size in Millimeters H	V	Size in Pixels H	V	Total Number of Pixels	Estimated Compression Ratio	Estimated Size in Kilo-Bytes	Bits (1 Bit Pixels)
A	50	11	8.5	550	425	233,750	A4	2	297	210	594	420	249,480	1 to 1	50	400,000
B	50	17	11	850	550	467,500	A3	2	420	297	840	594	498,960	1 to 1	100	800,000
C	50	22	17	1,100	850	935,000	A2	2	594	420	1,188	840	997,920	1 to 1	200	1,600,000
D	50	34	22	1,700	1,100	1,870,000	A1	2	841	594	1,682	1,188	1,998,216	1 to 1	400	3,200,000
E	50	44	34	2,200	1,700	3,740,000	A0	2	1,189	841	2,378	1,682	3,999,796	1 to 1	800	6,400,000
A	75	11	8.5	825	638	525,938	A4	3	297	210	891	630	561,330	1 to 1	50	400,000
B	75	17	11	1,275	825	1,051,875	A3	3	420	297	1,260	891	1,122,660	1 to 1	100	800,000
C	75	22	17	1,650	1,275	2,103,750	A2	3	594	420	1,782	1,260	2,245,320	1 to 1	200	1,600,000
D	75	34	22	2,550	1,650	4,207,500	A1	3	841	594	2,523	1,782	4,495,986	1 to 1	400	3,200,000
E	75	44	34	3,300	2,550	8,415,000	A0	3	1,189	841	3,567	2,523	8,999,541	1 to 1	800	6,400,000
A	100	11	8.5	1,100	850	935,000	A4	4	297	210	1,188	840	997,920	2 to 1	50	400,000
B	100	17	11	1,700	1,100	1,870,000	A3	4	420	297	1,680	1,188	1,995,840	2 to 1	100	800,000
C	100	22	17	2,200	1,700	3,740,000	A2	4	594	420	2,376	1,680	3,991,680	2 to 1	200	1,600,000
D	100	34	22	3,400	2,200	7,480,000	A1	4	841	594	3,364	2,376	7,992,864	2 to 1	400	3,200,000
E	100	44	34	4,400	3,400	14,960,000	A0	4	1,189	841	4,756	3,364	15,999,184	2 to 1	800	6,400,000
A	150	11	8.5	1,650	1,275	2,103,750	A4	6	297	210	1,782	1,260	2,245,320	5 to 1	50	400,000
B	150	17	11	2,550	1,650	4,207,500	A3	6	420	297	2,520	1,782	4,490,640	5 to 1	100	800,000
C	150	22	17	3,300	2,550	8,415,000	A2	6	594	420	3,564	2,520	8,981,280	5 to 1	200	1,600,000
D	150	34	22	5,100	3,300	16,830,000	A1	6	841	594	5,046	3,564	17,983,944	5 to 1	400	3,200,000
E	150	44	34	6,600	5,100	33,660,000	A0	6	1,189	841	7,134	5,046	35,998,164	5 to 1	800	6,400,000
A	200	11	8.5	2,200	1,700	3,740,000	A4	8	297	210	2,376	1,680	3,991,680	9 to 1	50	400,000
B	200	17	11	3,400	2,200	7,480,000	A3	8	420	297	3,360	2,376	7,983,360	9 to 1	100	800,000
C	200	22	17	4,400	3,400	14,960,000	A2	8	594	420	4,752	3,360	15,966,720	9 to 1	200	1,600,000
D	200	34	22	6,800	4,400	29,920,000	A1	8	841	594	6,728	4,752	31,971,456	9 to 1	400	3,200,000
E	200	44	34	8,800	6,800	59,840,000	A0	8	1,189	841	9,512	6,728	63,996,736	9 to 1	800	6,400,000
A	300	11	8.5	3,300	2,550	8,415,000	A4	12	297	210	3,564	2,520	8,981,280	21 to 1	50	400,000
B	300	17	11	5,100	3,300	16,830,000	A3	12	420	297	5,040	3,564	17,962,560	21 to 1	100	800,000
C	300	22	17	6,600	5,100	33,660,000	A2	12	594	420	7,128	5,040	35,925,120	21 to 1	200	1,600,000
D	300	34	22	10,200	6,600	67,320,000	A1	12	841	594	10,092	7,128	71,935,776	21 to 1	400	3,200,000
E	300	44	34	13,200	10,200	134,640,000	A0	12	1,189	841	14,268	10,092	143,992,656	21 to 1	800	6,400,000
A	400	11	8.5	4,400	3,400	14,960,000	A4	16	297	210	4,752	3,360	15,966,720	37 to 1	50	400,000
B	400	17	11	6,800	4,400	29,920,000	A3	16	420	297	6,720	4,752	31,933,440	37 to 1	100	800,000
C	400	22	17	8,800	6,800	59,840,000	A2	16	594	420	9,504	6,720	63,866,880	37 to 1	200	1,600,000
D	400	34	22	13,600	8,800	119,680,000	A1	16	841	594	13,456	9,504	127,885,824	37 to 1	400	3,200,000
E	400	44	34	17,600	13,600	239,360,000	A0	16	1,189	841	19,024	13,456	255,986,944	37 to 1	800	6,400,000
A	600	11	8.5	6,600	5,100	33,660,000	A4	24	297	210	7,128	5,040	35,925,120	84 to 1	50	400,000
B	600	17	11	10,200	6,600	67,320,000	A3	24	420	297	10,080	7,128	71,850,240	84 to 1	100	800,000
C	600	22	17	13,200	10,200	134,640,000	A2	24	594	420	14,256	10,080	143,700,480	84 to 1	200	1,600,000
D	600	34	22	20,400	13,200	269,280,000	A1	24	841	594	20,184	14,256	287,743,104	84 to 1	400	3,200,000
E	600	44	34	26,400	20,400	538,560,000	A0	24	1,189	841	28,536	20,184	575,970,624	84 to 1	800	6,400,000
A	800	11	8.5	8,800	6,800	59,840,000	A4	32	297	210	9,504	6,720	63,866,880	150 to 1	50	400,000
B	800	17	11	13,600	8,800	119,680,000	A3	32	420	297	13,440	9,504	127,733,760	150 to 1	100	800,000
C	800	22	17	17,600	13,600	239,360,000	A2	32	594	420	19,008	13,440	255,467,520	150 to 1	200	1,600,000
D	800	34	22	27,200	17,600	478,720,000	A1	32	841	594	26,912	19,008	511,543,296	150 to 1	400	3,200,000
E	800	44	34	35,200	27,200	957,440,000	A0	32	1,189	841	38,048	26,912	1,023,947,776	150 to 1	800	6,400,000
A	1,000	11	8.5	11,000	8,500	93,500,000	A4	40	297	210	11,880	8,400	99,792,000	234 to 1	50	400,000
B	1,000	17	11	17,000	11,000	187,000,000	A3	40	420	297	16,800	11,880	199,584,000	234 to 1	100	800,000
C	1,000	22	17	22,000	17,000	374,000,000	A2	40	594	420	23,760	16,800	399,168,000	234 to 1	200	1,600,000
D	1,000	34	22	34,000	22,000	748,000,000	A1	40	841	594	33,640	23,760	799,286,400	234 to 1	400	3,200,000
E	1,000	44	34	44,000	34,000	1,496,000,000	A0	40	1,189	841	47,560	33,640	1,599,918,400	234 to 1	800	6,400,000
A	1,200	11	8.5	13,200	10,200	134,640,000	A4	48	297	210	14,256	10,080	143,700,480	337 to 1	50	400,000
B	1,200	17	11	20,400	13,200	269,280,000	A3	48	420	297	20,160	14,256	287,400,960	337 to 1	100	800,000
C	1,200	22	17	26,400	20,400	538,560,000	A2	48	594	420	28,512	20,160	574,801,920	337 to 1	200	1,600,000
D	1,200	34	22	40,800	26,400	1,077,120,000	A1	48	841	594	40,368	28,512	1,150,972,416	337 to 1	400	3,200,000
E	1,200	44	34	52,800	40,800	2,154,240,000	A0	48	1,189	841	57,072	40,368	2,303,882,496	337 to 1	800	6,400,000
A	2,540	11	8.5	27,940	21,590	603,224,600	A4	100	297	210	29,700	21,000	623,700,000	1,508 to 1	50	400,000
B	2,540	17	11	43,180	27,940	1,206,449,200	A3	100	420	297	42,000	29,700	1,247,400,000	1,508 to 1	100	800,000
C	2,540	22	17	55,880	43,180	2,412,898,400	A2	100	594	420	59,400	42,000	2,494,800,000	1,508 to 1	200	1,600,000
D	2,540	34	22	86,360	55,880	4,825,796,800	A1	100	841	594	84,100	59,400	4,995,540,000	1,508 to 1	400	3,200,000
E	2,540	44	34	111,760	86,360	9,651,593,600	A0	100	1,189	841	118,900	84,100	9,999,490,000	1,508 to 1	800	6,400,000

Pixels per Sheet

When scanning paper documents, the paper sheet size and the resolution (dpi – dots per inch) in pixels (pixels per inch) determine the number of pixels sampled per sheet.

Both customary US and metric sheet sizes are given, along with the uncompressed and compressed images sizes.

The new US customary sheet sizes are based on a letter size of 8 1/2 by 11 inches. The documents for the highest priority for conversion (scanning) are often an organization's newest documents. The old US customary sheet sizes are based on a letter size of 9 by 12 inches (see page 2, not reproduced in short version of this paper). System sizing should be based on the old customary sheet sizes because scanned documents usually include the oldest of an organization's documents.

The resolution is given in dots (pixels) per inch (dpi or ppi) and dots per millimeter (dpmm or ppmm). There are 25.4 millimeters in 1 inch; so 1 dpmm is almost exactly equal to 25 dpi.

The size of the sheets is given (H x V) (Horizontal x Vertical) sizes in inches, mm (millimeters) and pixels.

The total number of pixels in the product of the number of horizontal pixels times the number of vertical pixels.

The estimated compression ratio is the ratio of the total number of pixels to the estimated compressed size in bits. The number of bits is equal to the number of pixels in this case because all of the images are assumed to be scanned and then process down to 1 bit per pixel (black or white pixels). The compressed image size is based on an estimate of 50 KiloBytes for a compressed letter size page. The number of Kilobytes times 1 thousand (conversion for KiloBytes to Bytes) times 8 (conversion of Bytes to bits) equals the number of bits per image.

Generally, compression removes the redundance from an image. Increasing scan resolution increases the redundancy in an image because increasing the resolution increases the number of pixels used to represent the fixed information content of the scanned sheet. Thus, increases in resolution are canceled out by the increase in the corresponding removal of redundance by the compression algorithm. This is generally true, but a dirty sheet of paper has a large amount of noise (slat and pepper speckles), which is considered information by the compression algorithm and therefore causes an increase in image size as resolution is increased. In addition, this generalization is less true at very low resolutions and very high resolutions.

Pixels per Scanned Sheet Image: Uncompressed and Compressed

Number of Pixels Needed to Represent Standard Size Sheets of Paper Using Customary Scan Resolutions

Paper Sheet Sizes in (Old) US Customary Measure							Paper Sheet Sizes in Metric Measure							Compression		
Paper Size Name	Dots per Inch	Size in Inches H	V	Size in Pixels H	V	Total Number of Pixels	Paper Size Name	Dots per mm	Size in Millimeters H	V	Size in Pixels H	V	Total Number of Pixels	Estimated Compression Ratio	Estimated Size in Kilo-Bytes	Estimated Size in Bits (1 Bit Pixels)
A	50	12	9	600	450	270,000	A4	2	297	210	594	420	249,480	1 to 1	50	400,000
B	50	18	12	900	600	540,000	A3	2	420	297	840	594	498,960	1 to 1	100	800,000
C	50	24	18	1,200	900	1,080,000	A2	2	594	420	1,188	840	997,920	1 to 1	200	1,600,000
D	50	36	24	1,800	1,200	2,160,000	A1	2	841	594	1,682	1,188	1,998,216	1 to 1	400	3,200,000
E	50	48	36	2,400	1,800	4,320,000	A0	2	1,189	841	2,378	1,682	3,999,796	1 to 1	800	6,400,000
A	75	12	9	900	638	573,750	A4	3	297	210	891	630	561,330	1 to 1	50	400,000
B	75	18	12	1,350	900	1,215,000	A3	3	420	297	1,260	891	1,122,660	2 to 1	100	800,000
C	75	24	18	1,800	1,350	2,430,000	A2	3	594	420	1,782	1,260	2,245,320	2 to 1	200	1,600,000
D	75	36	24	2,700	1,800	4,860,000	A1	3	841	594	2,523	1,782	4,495,986	2 to 1	400	3,200,000
E	75	48	36	3,600	2,700	9,720,000	A0	3	1,189	841	3,567	2,523	8,999,541	2 to 1	800	6,400,000
A	100	12	9	1,200	850	1,020,000	A4	4	297	210	1,188	840	997,920	3 to 1	50	400,000
B	100	18	12	1,800	1,200	2,160,000	A3	4	420	297	1,680	1,188	1,995,840	3 to 1	100	800,000
C	100	24	18	2,400	1,800	4,320,000	A2	4	594	420	2,376	1,680	3,991,680	3 to 1	200	1,600,000
D	100	36	24	3,600	2,400	8,640,000	A1	4	841	594	3,364	2,376	7,992,864	3 to 1	400	3,200,000
E	100	48	36	4,800	3,600	17,280,000	A0	4	1,189	841	4,756	3,364	15,999,184	3 to 1	800	6,400,000
A	150	12	9	1,800	1,275	2,295,000	A4	6	297	210	1,782	1,260	2,245,320	6 to 1	50	400,000
B	150	18	12	2,700	1,800	4,860,000	A3	6	420	297	2,520	1,782	4,490,640	6 to 1	100	800,000
C	150	24	18	3,600	2,700	9,720,000	A2	6	594	420	3,564	2,520	8,981,280	6 to 1	200	1,600,000
D	150	36	24	5,400	3,600	19,440,000	A1	6	841	594	5,046	3,564	17,983,944	6 to 1	400	3,200,000
E	150	48	36	7,200	5,400	38,880,000	A0	6	1,189	841	7,134	5,046	35,998,164	6 to 1	800	6,400,000
A	200	12	9	2,400	1,700	4,080,000	A4	8	297	210	2,376	1,680	3,991,680	10 to 1	50	400,000
B	200	18	12	3,600	2,400	8,640,000	A3	8	420	297	3,360	2,376	7,983,360	11 to 1	100	800,000
C	200	24	18	4,800	3,600	17,280,000	A2	8	594	420	4,752	3,360	15,966,720	11 to 1	200	1,600,000
D	200	36	24	7,200	4,800	34,560,000	A1	8	841	594	6,728	4,752	31,971,456	11 to 1	400	3,200,000
E	200	48	36	9,600	7,200	69,120,000	A0	8	1,189	841	9,512	6,728	63,996,736	11 to 1	800	6,400,000
A	300	12	9	3,600	2,550	9,180,000	A4	12	297	210	3,564	2,520	8,981,280	23 to 1	50	400,000
B	300	18	12	5,400	3,600	19,440,000	A3	12	420	297	5,040	3,564	17,962,560	24 to 1	100	800,000
C	300	24	18	7,200	5,400	38,880,000	A2	12	594	420	7,128	5,040	35,925,120	24 to 1	200	1,600,000
D	300	36	24	10,800	7,200	77,760,000	A1	12	841	594	10,092	7,128	71,935,776	24 to 1	400	3,200,000
E	300	48	36	14,400	10,800	155,520,000	A0	12	1,189	841	14,268	10,092	143,992,656	24 to 1	800	6,400,000
A	400	12	9	4,800	3,400	16,320,000	A4	16	297	210	4,752	3,360	15,966,720	41 to 1	50	400,000
B	400	18	12	7,200	4,800	34,560,000	A3	16	420	297	6,720	4,752	31,933,440	43 to 1	100	800,000
C	400	24	18	9,600	7,200	69,120,000	A2	16	594	420	9,504	6,720	63,866,880	43 to 1	200	1,600,000
D	400	36	24	14,400	9,600	138,240,000	A1	16	841	594	13,456	9,504	127,885,824	43 to 1	400	3,200,000
E	400	48	36	19,200	14,400	276,480,000	A0	16	1,189	841	19,024	13,456	255,986,944	43 to 1	800	6,400,000
A	600	12	9	7,200	5,100	36,720,000	A4	24	297	210	7,128	5,040	35,925,120	92 to 1	50	400,000
B	600	18	12	10,800	7,200	77,760,000	A3	24	420	297	10,080	7,128	71,850,240	97 to 1	100	800,000
C	600	24	18	14,400	10,800	155,520,000	A2	24	594	420	14,256	10,080	143,700,480	97 to 1	200	1,600,000
D	600	36	24	21,600	14,400	311,040,000	A1	24	841	594	20,184	14,256	287,743,104	97 to 1	400	3,200,000
E	600	48	36	28,800	21,600	622,080,000	A0	24	1,189	841	28,536	20,184	575,970,624	97 to 1	800	6,400,000
A	800	12	9	9,600	6,800	65,280,000	A4	32	297	210	9,504	6,720	63,866,880	163 to 1	50	400,000
B	800	18	12	14,400	9,600	138,240,000	A3	32	420	297	13,440	9,504	127,733,760	173 to 1	100	800,000
C	800	24	18	19,200	14,400	276,480,000	A2	32	594	420	19,008	13,440	255,467,520	173 to 1	200	1,600,000
D	800	36	24	28,800	19,200	552,960,000	A1	32	841	594	26,912	19,008	511,543,296	173 to 1	400	3,200,000
E	800	48	36	38,400	28,800	1,105,920,000	A0	32	1,189	841	38,048	26,912	1,023,947,776	173 to 1	800	6,400,000
A	1,000	12	9	12,000	8,500	102,000,000	A4	40	297	210	11,880	8,400	99,792,000	255 to 1	50	400,000
B	1,000	18	12	18,000	12,000	216,000,000	A3	40	420	297	16,800	11,880	199,584,000	270 to 1	100	800,000
C	1,000	24	18	24,000	18,000	432,000,000	A2	40	594	420	23,760	16,800	399,168,000	270 to 1	200	1,600,000
D	1,000	36	24	36,000	24,000	864,000,000	A1	40	841	594	33,640	23,760	799,286,400	270 to 1	400	3,200,000
E	1,000	48	36	48,000	36,000	1,728,000,000	A0	40	1,189	841	47,560	33,640	1,599,918,400	270 to 1	800	6,400,000
A	1,200	12	9	14,400	10,200	146,880,000	A4	48	297	210	14,256	10,080	143,700,480	367 to 1	50	400,000
B	1,200	18	12	21,600	14,400	311,040,000	A3	48	420	297	20,160	14,256	287,400,960	389 to 1	100	800,000
C	1,200	24	18	28,800	21,600	622,080,000	A2	48	594	420	28,512	20,160	574,801,920	389 to 1	200	1,600,000
D	1,200	36	24	43,200	28,800	1,244,160,000	A1	48	841	594	40,368	28,512	1,150,972,416	389 to 1	400	3,200,000
E	1,200	48	36	57,600	43,200	2,488,320,000	A0	48	1,189	841	57,072	40,368	2,303,882,496	389 to 1	800	6,400,000
A	2,540	12	9	30,480	21,590	658,063,200	A4	100	297	210	29,700	21,000	623,700,000	1,645 to 1	50	400,000
B	2,540	18	12	45,720	30,480	1,393,545,600	A3	100	420	297	42,000	29,700	1,247,400,000	1,742 to 1	100	800,000
C	2,540	24	18	60,960	45,720	2,787,091,200	A2	100	594	420	59,400	42,000	2,494,800,000	1,742 to 1	200	1,600,000
D	2,540	36	24	91,440	60,960	5,574,182,400	A1	100	841	594	84,100	59,400	4,995,540,000	1,742 to 1	400	3,200,000
E	2,540	48	36	121,920	91,440	11,148,364,800	A0	100	1,189	841	118,900	84,100	9,999,490,000	1,742 to 1	800	6,400,000

Old US Customary Paper Sheet Size Measure

These US sheet sizes are based on the old letter size of 9 by 12 inches. These sizes should be used for system sizing because most document imaging systems include some of the oldest document in an organization. In particular, the scanners used should be able to scan across the widest of an organization's old documents. When printing, resizing of the old documents to the new document sizes may change the drawing scales. This possibility should be explained to system users in the system portal documentation.

Pixels per Scanned Sheet Image: Uncompressed and Compressed

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Steve Gilheany, BA in Computer Science, MBA, MLS Specialization in Information Science, CDIA (Certified Document Imaging System Architect), AIIM Maser, and AIIM Laureate, of Information Technologies, CRM (Certified Records Manager, ARMA) has twenty years experience in document imaging and is a Sr. Systems Engineer at Archive Builders.

Author

Steve Gilheany is a Sr. Systems Engineer at Archive Builders. He has worked in digital document management and document imaging for twenty years.

His experience in the application of document management and document imaging in industry includes: aerospace, banking, manufacturing, natural resources, petroleum refining, transportation, energy, federal, state, and local government, civil engineering, utilities, entertainment, commercial records centers, archives, non-profit development, education, and administrative, engineering, production, legal, and medical records management. At the same time, he has worked in product management for hypertext, for windows based user interface systems, for computer displays, for engineering drawing, letter size, microform, and color scanning, and for xerographic, photographic, newspaper, engineering drawing, and color printing.

In addition, he has nine years of experience in data center operations and database and computer communications systems design, programming, testing, and software configuration management. He has an MLS Specialization in Information Science and an MBA with a concentration in Computer and Information Systems from UCLA, a California Adult Education teaching credential, and a BA in Computer Science from the University of Wisconsin at Madison. His industry certifications include: the CDIA (Certified Document Imaging System Architect) and the AIIM Master (MIT), and AIIM Laureate (LIT), of Information Technologies (from AIIM International, the Association of Information and Image Management, www.AIIM.org), and the CRM (Certified Records Manager) (from the ICRM, the Institute of Certified Records Managers, the official certifying body for ARMA International, the Association of Records Managers and Administrators, www.ARMA.org).

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