

INTRODUCTION TO DEPTH OF FIELD, & CIRCLE OF CONFUSION (C of C)

This document presents the depth of field (in feet) for focal lengths of 12mm to 200mm, when used with the Nikon D70 body. It must be remembered, the focal length of a lens is dependent only upon the lens itself. It doesn't change when used with a camera having less (or more) of an imaging size. However, since most digital cameras have an imaging chip which is smaller than a 35 mm frame (24mm x 36mm), the effective field of view is less. Therefore, the lens is said to have a 35 mm equivalent focal length, so that photographers can relate to their activities with a 35mm camera.

Theoretically, the image produced by a lens starts to "blur" when a subject is not at the precise focusing distance used. The amount of "blur" varies with the true focal length, the f stop, and the focusing distance, and is called the Circle of Confusion (C of C). There is no magic number to define the correct blur. The final print size to be made is of course important here. In the days of film, typically a C of C was set by the diagonal of the negative (image) divided by 1600 to 1700. So, for the D70, the imaging chip diagonal is just under 29mm, and the C of C comes out to about .02mm.

The charts which follow use this value. The C of C is directly related to the aperture desired. If you wanted to have a C of C which was .01mm, use these charts, and just multiply the f stop shown by the same factor you used to reduce the C of C. The depth of field read off in the charts will then reflect the smaller C of C. In other words, at a given focusing distance, the DOF is exactly the same for f 2.0 at .02mm C of C, as f 4.0 at a .01mm C of C.

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DOF distances for Nikon D70 at 12 mm (35 mm equiv = 18 mm) zoom setting. C of C = 0.020 mm, which is 2.5 pixels

Dist - ft	f2.8 - far	f2.8 - near	f4.0 - far	f4.0 - near	f5.6 - far	f5.6 - near	f8.0 - far	f8.0 - near	f11 - far	f11 - near	f16 - far	f16 - near
2	2.23	1.81	2.34	1.74	2.51	1.66	2.83	1.55	3.34	1.43	4.82	1.26
3	3.55	2.60	3.85	2.46	4.35	2.29	5.39	2.08	7.67	1.86	26.30	1.59
4	5.05	3.31	5.69	3.08	6.84	2.83	9.84	2.51	21.76	2.20	Infinity	1.83
5	6.76	3.97	7.96	3.64	10.44	3.29	19.55	2.87	Infinity	2.47	Infinity	2.01
6	8.74	4.57	10.86	4.15	16.06	3.69	57.04	3.17	Infinity	2.69	Infinity	2.15
7	11.04	5.12	14.67	4.60	26.10	4.04	Infinity	3.42	Infinity	2.87	Infinity	2.26
8	13.76	5.64	19.90	5.01	49.15	4.35	Infinity	3.64	Infinity	3.03	Infinity	2.36
9	17.02	6.12	27.55	5.38	Infinity	4.63	Infinity	3.84	Infinity	3.16	Infinity	2.44
10	21.01	6.56	39.78	5.72	Infinity	4.88	Infinity	4.00	Infinity	3.27	Infinity	2.50
12	32.39	7.36	Infinity	6.32	Infinity	5.31	Infinity	4.29	Infinity	3.46	Infinity	2.61
15	70.63	8.39	Infinity	7.06	Infinity	5.82	Infinity	4.61	Infinity	3.66	Infinity	2.73
20	Infinity	9.75	Infinity	7.99	Infinity	6.45	Infinity	5.00	Infinity	3.90	Infinity	2.85
30	Infinity	11.64	Infinity	9.22	Infinity	7.22	Infinity	5.45	Infinity	4.17	Infinity	2.99
50	Infinity	13.76	Infinity	10.50	Infinity	7.98	Infinity	5.87	Infinity	4.41	Infinity	3.12

DOF distances for Nikon D70 at 18 mm (35 mm equiv = 27 mm) zoom setting. C of C = 0.020 mm, which is 2.5 pixels

Dist - ft	f2.8 - far	f2.8 - near	f4.0 - far	f4.0 - near	f5.6 - far	f5.6 - near	f8.0 - far	f8.0 - near	f11 - far	f11 - near	f16 - far	f16 - near
2	2.23	1.81	2.34	1.74	2.51	1.66	2.83	1.55	3.34	1.43	4.82	1.26
3	3.55	2.60	3.85	2.46	4.35	2.29	5.39	2.08	7.67	1.86	26.30	1.59
4	5.05	3.31	5.69	3.08	6.84	2.83	9.84	2.51	21.76	2.20	Infinity	1.83
5	6.76	3.97	7.96	3.64	10.44	3.29	19.55	2.87	Infinity	2.47	Infinity	2.01
6	8.74	4.57	10.86	4.15	16.06	3.69	57.04	3.17	Infinity	2.69	Infinity	2.15
7	11.04	5.12	14.67	4.60	26.10	4.04	Infinity	3.42	Infinity	2.87	Infinity	2.26
8	13.76	5.64	19.90	5.01	49.15	4.35	Infinity	3.64	Infinity	3.03	Infinity	2.36
9	17.02	6.12	27.55	5.38	Infinity	4.63	Infinity	3.84	Infinity	3.16	Infinity	2.44
10	21.01	6.56	39.78	5.72	Infinity	4.88	Infinity	4.00	Infinity	3.27	Infinity	2.50
12	32.39	7.36	Infinity	6.32	Infinity	5.31	Infinity	4.29	Infinity	3.46	Infinity	2.61
15	70.63	8.39	Infinity	7.06	Infinity	5.82	Infinity	4.61	Infinity	3.66	Infinity	2.73
20	Infinity	9.75	Infinity	7.99	Infinity	6.45	Infinity	5.00	Infinity	3.90	Infinity	2.85
30	Infinity	11.64	Infinity	9.22	Infinity	7.22	Infinity	5.45	Infinity	4.17	Infinity	2.99
50	Infinity	13.76	Infinity	10.50	Infinity	7.98	Infinity	5.87	Infinity	4.41	Infinity	3.12

DOF distances for Nikon D70 at 24 mm (35 mm equiv = 36 mm) zoom setting. C of C = 0.020 mm, which is 2.5 pixels

Dist - ft	f2.8 - far	f2.8 - near	f4.0 - far	f4.0 - near	f5.6 - far	f5.6 - near	f8.0 - far	f8.0 - near	f11 - far	f11 - near	f16 - far	f16 - near
2	2.12	1.89	2.18	1.85	2.26	1.80	2.39	1.72	2.58	1.63	2.97	1.51
3	3.28	2.76	3.42	2.67	3.63	2.56	3.99	2.40	4.55	2.24	5.94	2.01
4	4.53	3.58	4.80	3.43	5.21	3.25	5.99	3.00	7.36	2.75	11.92	2.40
5	5.85	4.36	6.32	4.14	7.06	3.87	8.58	3.53	11.72	3.18	30.10	2.73
6	7.28	5.10	8.01	4.80	9.25	4.44	12.04	4.00	19.34	3.55	Infinity	3.00
7	8.81	5.81	9.90	5.41	11.87	4.96	16.92	4.41	36.14	3.88	Infinity	3.22
8	10.46	6.48	12.04	5.99	15.09	5.44	24.32	4.79	Infinity	4.16	Infinity	3.42
9	12.24	7.12	14.47	6.53	19.11	5.89	36.86	5.13	Infinity	4.41	Infinity	3.58
10	14.17	7.73	17.25	7.04	24.29	6.30	62.72	5.43	Infinity	4.64	Infinity	3.73
12	18.56	8.87	24.24	7.97	40.96	7.03	Infinity	5.97	Infinity	5.02	Infinity	3.97
15	26.90	10.40	40.77	9.19	Infinity	7.96	Infinity	6.62	Infinity	5.48	Infinity	4.25
20	48.87	12.57	Infinity	10.85	Infinity	9.17	Infinity	7.44	Infinity	6.02	Infinity	4.57
30	Infinity	15.90	Infinity	13.23	Infinity	10.81	Infinity	8.49	Infinity	6.69	Infinity	4.94
50	Infinity	20.16	Infinity	16.05	Infinity	12.62	Infinity	9.56	Infinity	7.34	Infinity	5.29

DOF distances for Nikon D70 at 35 mm (35 mm equiv = 53 mm) zoom setting. C of C = 0.020 mm, which is 2.5 pixels

Dist - ft	f2.8 - far	f2.8 - near	f4.0 - far	f4.0 - near	f5.6 - far	f5.6 - near	f8.0 - far	f8.0 - near	f11 - far	f11 - near	f16 - far	f16 - near
2	2.05	1.95	2.08	1.93	2.11	1.90	2.16	1.86	2.23	1.81	2.35	1.74
3	3.13	2.88	3.18	2.84	3.26	2.78	3.39	2.69	3.56	2.59	3.90	2.44
4	4.23	3.79	4.34	3.71	4.49	3.61	4.73	3.46	5.08	3.30	5.79	3.05
5	5.37	4.68	5.54	4.56	5.79	4.40	6.21	4.19	6.83	3.94	8.19	3.60
6	6.54	5.54	6.80	5.37	7.18	5.15	7.84	4.86	8.85	4.54	11.30	4.08
7	7.74	6.39	8.11	6.16	8.66	5.87	9.65	5.49	11.24	5.08	15.51	4.52
8	8.99	7.21	9.49	6.91	10.25	6.56	11.66	6.09	14.08	5.59	21.52	4.91
9	10.27	8.01	10.94	7.65	11.96	7.21	13.93	6.65	17.53	6.05	30.81	5.27
10	11.60	8.79	12.45	8.35	13.81	7.84	16.50	7.17	21.81	6.49	47.08	5.59
12	14.38	10.29	15.72	9.70	17.95	9.01	22.79	8.14	34.39	7.27	Infinity	6.16
15	18.93	12.42	21.32	11.57	25.64	10.60	36.85	9.42	81.23	8.26	Infinity	6.86
20	27.67	15.66	33.12	14.33	44.89	12.87	96.23	11.16	Infinity	9.57	Infinity	7.74
30	51.43	21.18	74.12	18.81	Infinity	16.36	Infinity	13.70	Infinity	11.38	Infinity	8.87
50	Infinity	29.49	Infinity	25.08	Infinity	20.91	Infinity	16.74	Infinity	13.40	Infinity	10.05

DOF distances for Nikon D70 at 50 mm (35 mm equiv = 75 mm) zoom setting. C of C = 0.020 mm, which is 2.5 pixels

Dist - ft	f2.8 - far	f2.8 - near	f4.0 - far	f4.0 - near	f5.6 - far	f5.6 - near	f8.0 - far	f8.0 - near	f11 - far	f11 - near	f16 - far	f16 - near
2	2.03	1.98	2.04	1.96	2.05	1.95	2.07	1.93	2.10	1.91	2.15	1.87
3	3.06	2.94	3.09	2.92	3.12	2.89	3.18	2.84	3.25	2.79	3.37	2.70
4	4.11	3.90	4.16	3.86	4.22	3.80	4.32	3.72	4.46	3.63	4.70	3.48
5	5.17	4.84	5.25	4.77	5.35	4.69	5.52	4.57	5.75	4.43	6.16	4.21
6	6.25	5.77	6.36	5.68	6.52	5.56	6.77	5.39	7.11	5.19	7.77	4.89
7	7.34	6.69	7.50	6.56	7.72	6.40	8.08	6.18	8.57	5.91	9.55	5.53
8	8.45	7.59	8.66	7.43	8.96	7.23	9.44	6.94	10.13	6.61	11.53	6.13
9	9.58	8.49	9.85	8.29	10.24	8.03	10.88	7.68	11.80	7.27	13.74	6.69
10	10.72	9.37	11.06	9.12	11.55	8.82	12.38	8.39	13.59	7.91	16.23	7.23
12	13.06	11.10	13.57	10.76	14.32	10.33	15.61	9.75	17.59	9.11	22.31	8.21
15	16.69	13.62	17.54	13.10	18.81	12.47	21.11	11.63	24.93	10.73	35.65	9.50
20	23.14	17.61	24.80	16.76	27.44	15.74	32.64	14.42	42.77	13.05	88.65	11.27
30	37.68	24.92	42.33	23.23	50.65	21.31	71.84	18.96	Infinity	16.66	Infinity	13.86
50	75.81	37.30	97.35	33.64	Infinity	29.74	Infinity	25.34	Infinity	21.39	Infinity	16.97

DOF distances for Nikon D70 at 70 mm (35 mm equiv = 105 mm) zoom setting. C of C = 0.020 mm, which is 2.5 pixels

Dist - ft	f2.8 - far	f2.8 - near	f4.0 - far	f4.0 - near	f5.6 - far	f5.6 - near	f8.0 - far	f8.0 - near	f11 - far	f11 - near	f16 - far	f16 - near
2	2.01	1.99	2.02	1.98	2.02	1.98	2.04	1.97	2.05	1.95	2.07	1.93
3	3.03	2.97	3.04	2.96	3.06	2.94	3.09	2.92	3.12	2.89	3.18	2.84
4	4.05	3.95	4.08	3.93	4.11	3.90	4.16	3.86	4.22	3.80	4.32	3.72
5	5.08	4.92	5.12	4.88	5.17	4.84	5.25	4.77	5.35	4.69	5.52	4.57
6	6.12	5.88	6.18	5.83	6.25	5.77	6.37	5.67	6.51	5.56	6.78	5.38
7	7.17	6.84	7.24	6.77	7.35	6.68	7.51	6.56	7.72	6.41	8.09	6.17
8	8.22	7.79	8.32	7.70	8.46	7.59	8.67	7.43	8.95	7.23	9.46	6.93
9	9.28	8.73	9.41	8.62	9.59	8.48	9.86	8.28	10.23	8.03	10.91	7.66
10	10.35	9.67	10.51	9.54	10.73	9.36	11.08	9.11	11.54	8.82	12.42	8.37
12	12.51	11.53	12.75	11.34	13.07	11.09	13.59	10.74	14.31	10.33	15.67	9.72
15	15.81	14.27	16.19	13.97	16.72	13.60	17.59	13.08	18.80	12.48	21.25	11.59
20	21.48	18.71	22.18	18.21	23.20	17.58	24.90	16.71	27.42	15.74	32.99	14.35
30	33.47	27.18	35.22	26.13	37.86	24.84	42.64	23.14	50.65	21.31	73.71	18.83
50	60.50	42.61	66.47	40.07	76.57	37.12	99.14	33.43	Infinity	29.73	Infinity	25.11

DOF distances for Nikon D70 at 105 mm (35 mm equiv = 158 mm) zoom setting. C of C = 0.020 mm, which is 2.5 pixels

Dist - ft	f2.8 - far	f2.8 - near	f4.0 - far	f4.0 - near	f5.6 - far	f5.6 - near	f8.0 - far	f8.0 - near	f11 - far	f11 - near	f16 - far	f16 - near
2	2.01	1.99	2.01	1.99	2.01	1.99	2.01	1.99	2.02	1.98	2.03	1.97
3	3.01	2.99	3.02	2.98	3.02	2.98	3.04	2.97	3.05	2.95	3.07	2.93
4	4.02	3.98	4.03	3.97	4.05	3.96	4.07	3.94	4.09	3.91	4.13	3.87
5	5.04	4.96	5.05	4.95	5.07	4.93	5.11	4.90	5.15	4.86	5.21	4.80
6	6.05	5.95	6.08	5.93	6.11	5.90	6.15	5.85	6.21	5.80	6.32	5.71
7	7.07	6.93	7.10	6.90	7.15	6.86	7.21	6.80	7.30	6.73	7.44	6.61
8	8.10	7.91	8.14	7.87	8.19	7.81	8.28	7.74	8.39	7.64	8.58	7.49
9	9.12	8.88	9.18	8.83	9.25	8.76	9.36	8.67	9.50	8.55	9.75	8.36
10	10.15	9.85	10.22	9.79	10.31	9.71	10.45	9.59	10.62	9.44	10.93	9.21
12	12.22	11.79	12.32	11.70	12.45	11.58	12.65	11.41	12.92	11.21	13.38	10.88
15	15.35	14.67	15.50	14.53	15.71	14.35	16.04	14.09	16.47	13.77	17.24	13.28
20	20.63	19.41	20.91	19.17	21.30	18.85	21.91	18.40	22.72	17.86	24.21	17.04
30	31.44	28.68	32.11	28.15	33.04	27.48	34.53	26.52	36.61	25.41	40.68	23.76
50	54.17	46.43	56.17	45.05	59.09	43.33	64.09	40.99	71.66	38.40	89.22	34.73

DOF distances for Nikon D70 at 135 mm (35 mm equiv = 203 mm) zoom setting. C of C = 0.020 mm, which is 2.5 pixels

Dist - ft	f2.8 - far	f2.8 - near	f4.0 - far	f4.0 - near	f5.6 - far	f5.6 - near	f8.0 - far	f8.0 - near	f11 - far	f11 - near	f16 - far	f16 - near
2	2.00	2.00	2.00	2.00	2.01	1.99	2.01	1.99	2.01	1.99	2.02	1.98
3	3.01	2.99	3.01	2.99	3.01	2.99	3.02	2.98	3.03	2.97	3.04	2.96
4	4.01	3.99	4.02	3.98	4.03	3.97	4.04	3.96	4.05	3.95	4.08	3.93
5	5.02	4.98	5.03	4.97	5.04	4.96	5.06	4.94	5.09	4.92	5.13	4.88
6	6.03	5.97	6.04	5.96	6.06	5.94	6.09	5.91	6.13	5.88	6.18	5.83
7	7.04	6.96	7.06	6.94	7.09	6.92	7.13	6.88	7.17	6.83	7.25	6.76
8	8.06	7.94	8.08	7.92	8.11	7.89	8.17	7.84	8.23	7.78	8.34	7.69
9	9.07	8.93	9.10	8.90	9.15	8.86	9.21	8.80	9.29	8.73	9.43	8.61
10	10.09	9.91	10.13	9.87	10.18	9.82	10.26	9.75	10.36	9.66	10.54	9.51
12	12.13	11.87	12.19	11.82	12.27	11.75	12.38	11.64	12.53	11.51	12.79	11.30
15	15.21	14.80	15.30	14.71	15.42	14.60	15.61	14.44	15.85	14.24	16.27	13.92
20	20.37	19.64	20.54	19.49	20.76	19.29	21.11	19.00	21.55	18.66	22.34	18.10
30	30.85	29.19	31.24	28.86	31.76	28.43	32.58	27.80	33.66	27.06	35.64	25.90
50	52.44	47.78	53.55	46.89	55.12	45.75	57.65	44.14	61.16	42.28	68.06	39.51

DOF distances for Nikon D70 at 200 mm (35 mm equiv = 300 mm) zoom setting. C of C = 0.020 mm, which is 2.5 pixels

Dist - ft	f2.8 - far	f2.8 - near	f4.0 - far	f4.0 - near	f5.6 - far	f5.6 - near	f8.0 - far	f8.0 - near	f11 - far	f11 - near	f16 - far	f16 - near
2	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.01	1.99
3	3.00	3.00	3.00	3.00	3.01	2.99	3.01	2.99	3.01	2.99	3.02	2.98
4	4.01	3.99	4.01	3.99	4.01	3.99	4.02	3.98	4.02	3.98	4.03	3.97
5	5.01	4.99	5.01	4.99	5.02	4.98	5.03	4.97	5.04	4.96	5.05	4.95
6	6.01	5.99	6.02	5.98	6.03	5.97	6.04	5.96	6.05	5.95	6.08	5.92
7	7.02	6.98	7.03	6.97	7.04	6.96	7.05	6.95	7.08	6.93	7.11	6.89
8	8.03	7.97	8.04	7.96	8.05	7.95	8.07	7.93	8.10	7.90	8.15	7.86
9	9.03	8.97	9.05	8.95	9.06	8.94	9.09	8.91	9.13	8.88	9.19	8.82
10	10.04	9.96	10.06	9.94	10.08	9.92	10.12	9.89	10.16	9.85	10.23	9.78
12	12.06	11.94	12.08	11.92	12.12	11.88	12.17	11.84	12.23	11.78	12.34	11.68
15	15.09	14.91	15.13	14.87	15.19	14.82	15.27	14.74	15.37	14.65	15.54	14.49
20	20.17	19.84	20.24	19.77	20.34	19.67	20.48	19.54	20.67	19.37	20.99	19.10
30	30.38	29.63	30.55	29.47	30.77	29.27	31.11	28.96	31.55	28.59	32.31	28.00
50	51.08	48.97	51.55	48.54	52.20	47.98	53.20	47.16	54.51	46.18	56.84	44.63