

Cooke S4 Cine Prime Lens Data for Camera Motion Control
 Cooke Optics Ltd, Earle's Way, Thurmaston, Leicester LE4 8PT
 16 March 2002

For cine camera motion control it is necessary to know several critical lens parameters.

The parameters that are normally required are:

- (1) **Focal Length** and any variation of it with focussing
- (2) **Entrance Pupil Position** (the position about which the camera should be rotated when panning and tilting)
- (3) **Front Nodal Point Position** (for the calculation of depth of field)
- (4) **Maximum Forward Movement** for closest focus
- (5) **Closest Focusing Distance** (measured from the film plane)
- (6) **Image Scale at Closest Focus**

With the exception of the 150mm and 180mm lenses, the Cooke S4 series of cine lenses that are listed below do not change their focal length with focussing. And both the entrance pupil and the front nodal point move forward with focussing by the same distance that the whole lens moves forward with focussing.

Because of manufacturing variations from lens to lens it is only relevant to give nominal values for the above quantities, together with an indication of how much those nominal values will vary from lens to lens. The maximum variation of all the tabulated quantities is approximately +/-1.5%

f mm	E – F mm	N – F mm = "n ₀ "	Maximum Movement mm	N – F mm at closest focus = "n"	Closest Focus (CF) mm	Image Scale at CF
14	128.8	117.5	3.06	120.56	200.3	0.218
16	127.8	115.8	3.06	118.86	218.6	0.191
18	106.8	95.5	3.06	98.56	222.7	0.170
21	102.2	88.5	3.96	92.46	224.9	0.188
25	93.5	82.1	6.17	88.27	214.7	0.247
27	88.2	76.9	6.17	83.07	230.7	0.224
32	95.6	79.9	5.61	85.51	300.0	0.175
35	89.2	73.6	5.61	79.21	332.5	0.160
40	86.6	62.1	5.61	67.71	392.9	0.140
50	56.3	26.5	5.99	32.49	499.9	0.120
65	49.1	23.8	7.63	31.43	650.1	0.117
75	80.8	25.2	8.78	33.98	751.2	0.117
100	90.6	36.4	13.33	49.73	899.9	0.133
135	43.9	69.6	35.00	104.6	761.5	0.259
135 (LDS)	43.9	69.6	32.00	101.6	825.3	0.229
150	-121.5	-21.4	Internal	14.28	1049	0.184
180	-144.8	-25.6	Internal	17.02	1268	0.181

f is the effective focal length (normally just called "Focal Length")

F is the focal point

E – F is the position of the entrance pupil measured from the focal point (the distance of the entrance pupil from the film plane when the lens is focussed on infinity)

N – F is the same quantity for the front nodal point

Closest Focus (CF) is measured from the film plane. Image Scale is self-explanatory

Cooke Zoom Lens Data for Camera Motion Control

Cooke Optics Ltd, Earle's Way, Thurmaston, Leicester LE4 8PT

31st January 2003

f mm	E - F mm	N - F mm = "n ₀ "	Closest Focus (CF) mm	Image Scale at CF	f mm at CF	E - F mm	N - F mm = "n"
Cooke Varotal							
18	278	261	699	0.044	18.4	282	266
28	265	242	699	0.066	27.9	269	246
41	248	216	699	0.097	42.7	250	218
62	220	180	699	0.148	67.7	216	176
100	169	126	699	0.238	113	137	110
Cooke Cinetal							
25	292	267	1596	0.024	31.2	272	242
46	227	184	1596	0.042	59.6	172	118
83	140	68	1596	0.075	117	9	-86
147	26	-87	1596	0.133	236	-265	-410
261	-102	-257	1596	0.236	457	-722	-788

Note: In the case of zoom lenses, especially in the case of Cinetal, it is not safe to use n_0 rather than $n (= N - F)$ for the calculation of depth of field.