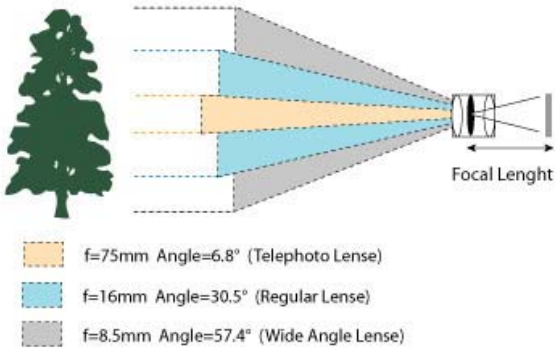
Lens Selection Guide

FOCAL LENGTH

The focal length of the lens is measured in mm and directly relates to the angle of view that will be achieved. Short focal lengths provide wide angles of view and long focal lengths become telephoto, with narrow angles of view. A "normal" angle of view is similar to what we see with our own eye, and has a relative focal length equal to the pick up device.

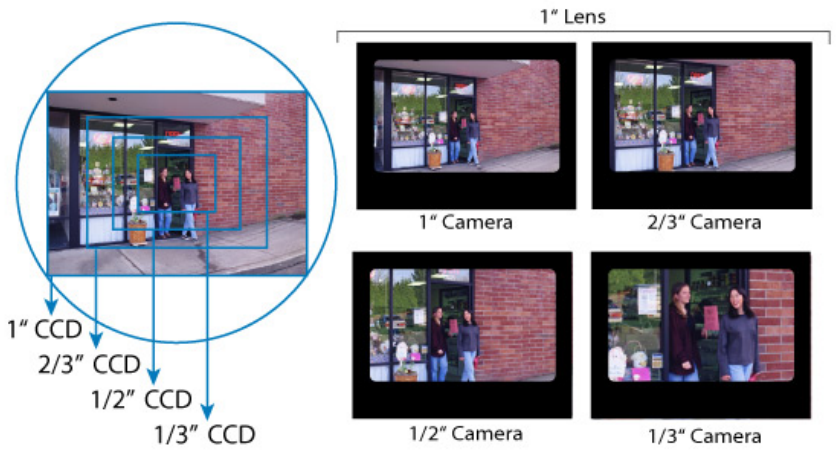


The chart below provides approximate viewing distances for a given focal length and object distance.

		Distance to Object / Width x Height in Feet										
	Focal Length	5 ft.	10 ft.	15 ft.	20 ft.	25 ft.	30 ft.	40 ft.	50 ft.	75 ft.	100 ft.	150 ft.
	2.8mm	9 x 6	17 x 13	26 x 19	34 x 26	43 x 32	51 x 39	69 x 51	86 x 64	129 x 96	171 x 129	257 x 193
	4mm	6 x 5	12 x 9	18 x 4	24 x 18	30 x 23	36 x 27	48 x 36	60 x 45	90 x 68	120 x 90	180 x 135
	6mm	4 x 3	8 x 6	12 x 9	16 x 12	20 x 12	24 x 18	32 x 24	40 x 30	60 x 45	80 x 60	120 x 96
	8mm	3 x 2	6 x 5	9 x 7	12 x 9	15 x 11	18 x 14	24 x 18	30 x 23	45 x 34	60 x 45	90 x 68
	12mm	2 x 1.5	4 x 3	6 x 4.5	8 x 6	10 x 8	12 x 9	16 x 12	20 x 15	30 x 23	40 x 30	60 x 45
	16mm	1.5 x 1.3	3 x 2.3	4.5 x 3.5	6 x 5	8 x 6	9 x 7	12 x 9	15 x 11	23 x 17	30 x 23	45 x 34
	25mm	96 x .72	2 x 1.5	3 x 2	4 x 3	5 x 3.5	6 x 4	8 x 6	10 x 7	14 x 11	19 x 14	29 x 22
	50mm	.48 x .36	.96 x .72	1.4 x 1	2 x 1.5	2.4 x 1.8	3 x 2	4 x 3	5 x 4	7 x 5	10 x 7	14 x 11
	75mm	.32 x .24	.64 x .48	.96 x .72	1.3 x .96	1.6 x 1.2	2 x 1.4	2.6 x 1.9	3 x 2	5 x 4	6 x 5	10 x 7
	3mm	8 x 6	16 x 12	24 x 18	32 x 24	40 x 30	48 x 36	64 x 48	80 x 60	120 x 90	160 x 120	240 x 180
	8mm	3 x 2	6 x 5	9 x 7	12 x 9	15 x 11	18 x 14	24 x 18	30 x 23	45 x 34	60 x 45	90 x 68
	5mm	5 x 4	10 x 8	14 x 11	19 x 14	24 x 18	29 x 22	38 x 29	48 x 36	72 x 54	96 x 72	144 x 108
	40mm	.60 x .45	1.2 x .90	1.8 x 1.3	2 x 1.8	3 x 2	4 x 3	5 x 4	6 x 5	9 x 7	12 x 9	18 x 14

CAMERA FORMAT

The size of the camera's imaging device (CCD) also affects the angle of view, with the smaller devices creating narrower angles of view when used on the same lens. The format of the lens, however, is irrelevant to the angle of view, it merely needs to project an image which will cover the device, i.e.: the same format of the camera or larger. This also means that 1/3" cameras can utilize the entire range of lenses from 1/3" to 1", with a 1/3" 8mm lens giving the same angle as a 2/3" 8mm lens. The latter combination also provides increased resolution and picture quality as only the center of the lens is being utilized, where the optics can be ground more accurately.

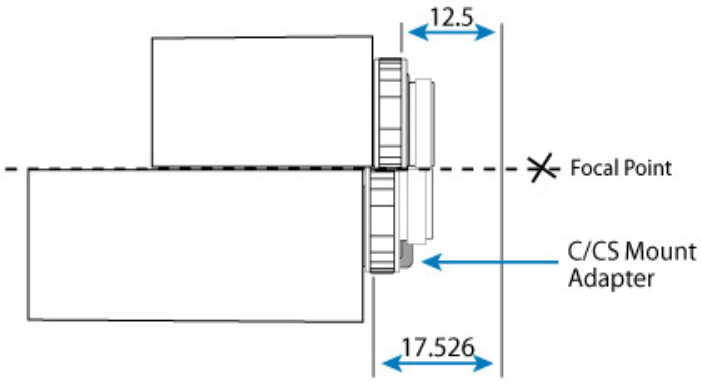


F STOP

The lens usually has two measurements of F stop or aperture, the maximum aperture (minimum F stop) when the lens is fully open, and the minimum aperture (maximum F stop) just before the lens completely closes. The F stop has a number of effects upon the final image. A low minimum F stop will mean the lens can pass more light in dark conditions, allowing the camera to produce a better image at night. A maximum F stop may be necessary where there is a very high level of light or reflection, as this will prevent the camera from "whiting out", and help maintain a constant video level. All auto iris lenses are supplied with Neutral Density spot filters to increase the maximum F stop. The F stop also directly affects the depth of field.

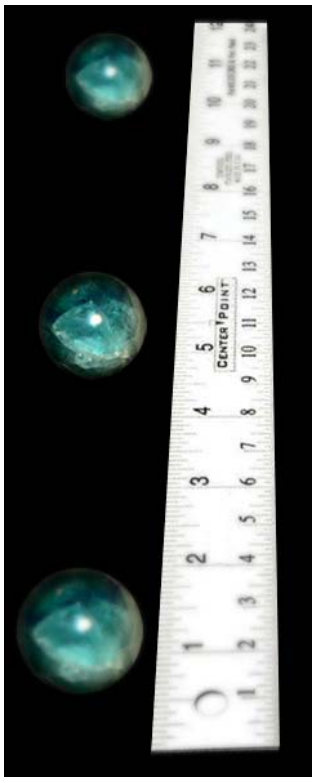
C or CS MOUNT

Modern cameras and lenses are generally CS mount. With CS mount cameras, both types of lenses can be used, but the C mount lens requires a 5mm ring to be fitted between the camera and lens to achieve a focused image. With C mount cameras it is not possible to use CS mount lenses.



DEPTH OF FIELD

The depth of field refers to the area within the field of view which is in focus. A large depth of field means that a large percentage of the field of view is in focus, from objects close to the lens often to infinity. A shallow depth of field has only a small section of the field of view in focus. The depth of field is influenced by several factors. A wide angle lens generally has a larger depth of field than a telephoto lens, and a higher F stop setting typically has a larger depth of field than a lower setting. With auto iris lenses, the automatic adjustment of the aperture also means constant variation of depth of field. The small depth of field is most apparent at night when the lens is fully open and the depth of field is at its minimum. Objects that were in focus during the day may become out of focus at night.



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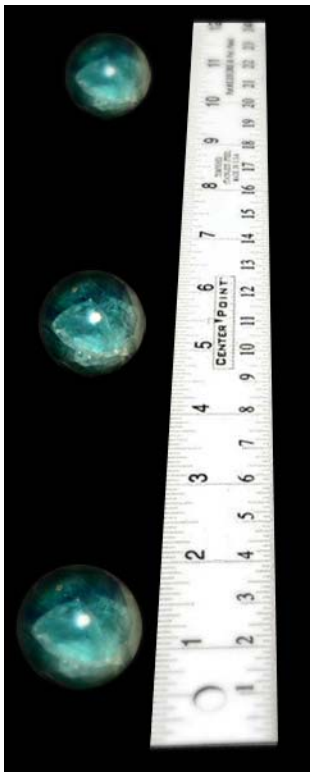

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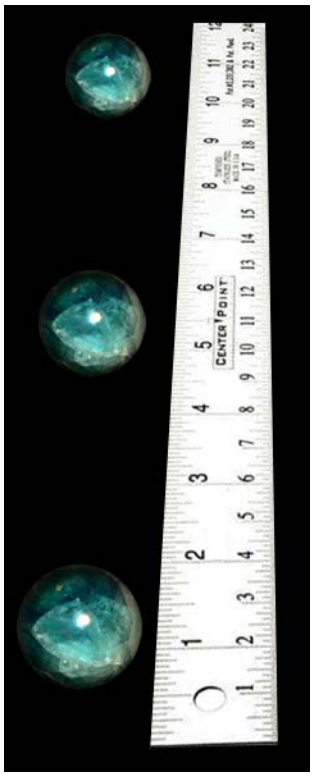

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AUTO or MANUAL IRIS

Auto iris lenses are generally used externally where there are variations in the lighting levels. Manual iris lenses are used normally for internal applications where the light level remains constant. However, with the introduction of electronic iris cameras it is now possible to use manual iris lenses in varying light conditions and the camera should electronically compensate. There are several considerations to this option though: the setting of the F stop becomes critical; if the iris is opened fully to allow the camera to work at night, the depth of field will be very small and it may be more difficult to achieve sharp focus even during the day. The camera can maintain normal video levels, but it cannot affect the depth of field. If the iris is closed to increase the depth of field, the low light performance of the camera will be reduced.

VIDEO DRIVE or DIRECT DRIVE

With auto iris lenses it is necessary to control the operation of the iris to maintain perfect picture levels. Video driven lenses contain amplifier circuitry to convert the video signal from the camera into iris motor control. With direct drive lenses, the camera must contain the amplifier circuitry, and the lens now only contains the galvanometric iris motor making it less expensive. The deciding factor depends on the auto iris output of the camera. Most now have both types.