How to Specify Lighting:

1) INFRA-RED OR WHITE-LIGHT?

Identifying the purpose of the system identifies the type of light to use.

Infra-Red light provides greater distance, a varying degree of invisibility (depending on the exact wavelength) and no light pollution. Infra-Red is light designed only to be used by CCTV cameras.

White-Light provides the opportunity to illuminate an area for pedestrians, staff or vehicles in addition to the CCTV system. It can also be used as a visual deterrent when turned on if an intruder is detected by a PIR.

2) ANGLE?

The illumination should ideally match the angle the camera / lens is set-to in order to provide best performance. If not, and too narrow an illumination angle is chosen, the camera will simply see a bright spot in the middle of the scene and the contrast between light and dark areas on scene will be too great to provide high quality images. Illumination which is too wide wastes energy and reduces achievable distance.

The table below shows the FOV angle for different fixed lenses as a reference.

FIXED LENSES					
Lens (mm)	Horizontal FOV - 1/3" CCD	Horizontal FOV - 1/2" CCD	RAYMAX Infra-Red	RAYLUX White-Light	RAYLUX-HID White-Light
2.8	92°	97°	RMxxx-AI-50	RLxxx-AI-50	RL-HID-150A
4	64°	78°	RMxxx-AI-50	RLxxx-AI-50	RL-HID-150A
6	44°	56°	RMxxx-AI-30	RLxxx-AI-30	RL-HID-150A
8	38°	44°	RMxxx-AI-30	RLxxx-AI-30	RL-HID-150A
12.5	22°	29°	RMxxx-AI-30	RLxxx-AI-30	RL-HID-150A
16	17°	23°	RMxxx-AI-30	RLxxx-AI-30	RL-HID-150A
25	11°	15°	RMxxx-AI-30	RLxxx-AI-30	RL-HID-150C
50	6°	7°	RMxxx-AI-30	RLxxx-AI-30	RL-HID-150C

NB: AI-50 = 50-100°, AI-30 = 30-60°, AI-120 = 120-180°,
A= Asymmetric, C= Circular

TECHNICAL ISSUE

The adoption of vari-focal lenses has caused difficulty in specifying lighting. With vari-focal lenses the exact FOV is often only established on site through trial and error making exact matching to fixed angle lighting impossible in advance. Raytec provide a range of Adaptive Illumination™ vari-focal lighting allowing the output angle of an illuminator to be adjusted on site to match the set-up of a vari-focal lens.

VARIFOCAL LENSES				
Lens (mm)	Horizontal FOV - 1/3" CCD	Horizontal FOV - 1/2" CCD	RAYMAX Infra-Red	RAYLUX White-Light
2.8 – 6	92° - 44°		RMxxx-AI-50	RLxxx-AI-50
3.5 – 8	78° - 38°		RMxxx-AI-50	RLxxx-AI-50
3.5 - 10.5	78° - 27°		RMxxx-AI-50	RLxxx-AI-50
4.5 – 12.5	60° - 23°	82° - 30°	RMxxx-AI-50	RLxxx-AI-50
7.5 - 120		35° - 2°	RMxxx-AI-30	RLxxx-AI-30
8.5 - 40	34° - 6°		RMxxx-AI-30	RLxxx-AI-30
10 - 30	20° - 7°	27° - 9°	RMxxx-AI-30	RLxxx-AI-30

NB: AI-50 = 50-100°, AI-30 = 30-60°, AI-120 = 120-180°

3) DISTANCE?

After selecting the angle, the next consideration is distance. How far should the lighting illuminate? Installers and specifiers should be aware that as angle increases, distance decreases.

As a guide, Raytec products can achieve the following distances:

Product	Wavelength	Illumination Angle			
		10-20°	30-60°	50-100°	120-180°
RM200	IR	250m	160m	112m	64m
RM100	IR	125m	80m	56m	32m
RM50	IR	n/a	40m	28m	16m
RM25*	IR	n/a	20m	14m	8m
RL200	White-Light	***	***	***	30m
RL100	White-Light	***	***	***	20m
RL50	White-Light	n/a	n/a	n/a	15m
RL25	White-Light	n/a	n/a	n/a	10m

* Fixed angles of 30°, 50° and 120° only ** Fixed angle of 120° *** Consult with Raytec

4) CAMERA AND LENS CONSIDERATIONS

Exact performance of any illuminator in a CCTV system is dependant upon the camera and lens combination used. For best results a high sensitivity camera (for IR projects an IR sensitive camera) should be used with a high transmission lens. Generally a CCTV imaging system (camera, lens, illumination) is only as good as its weakest link.