

# Basic Photography Film v Digital

## Film Speed

Film speed is related to grain size. The grains are the chemicals that are sensitive to light in the film's coating.

- Slow film is rated 100 ISO or less
- Fast film is rated 800 ISO or more

(ISO stands for International Standards Organisation)

A film grain is said to be exposed when it has absorbed 10 photons. Only 1 to 4 in every 100 photons falling on a film are absorbed. This is called a quantum efficiency of 1% to 4%

The larger the grain, the more photons will fall on it, so larger grains expose faster.

The grains on slow films are about 20 nm ( $2 \times 10^{-8}$  m) in size.

The grains on fast films are about 3 nm ( $3 \times 10^{-6}$  m) in size.

## Film Cameras

Film cameras have different 'formats' or film size. There are three common formats:

### Medium format

Medium format cameras use large pieces of film. This gives high quality photographs for books or glossy magazines.

### 35 mm

35 mm cameras have a film size of 36 x 24 mm. The photographs are used in newspapers.

### APS (Advanced Photo System)

APS cameras have a film size of 30 x 17 mm.

## Digital Cameras

The alternative to a film camera is a digital one. Digital cameras collect light on a CCD (charge coupled device). An amplifier then sends the results to a storage device.

The quantum efficiency of a CCD is about 70%. This means that exposure times are much less than for a film.

The size of a CCD is about 24 x 16 mm. Pixel size on a CCD is about 20 nm ( $2 \times 10^{-5}$  m).

Pixel sizes on film:	100 ISO film: $2 \times 10^{-8}$ m	800 ISO film: $3 \times 10^{-6}$ m
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Digital cameras obtain images faster than film cameras because

- They have a higher quantum efficiency,
- Their grain or pixel size is larger.

Film produces finer detail than a CCD because of the smaller pixel size.

Some digital cameras can be set to different ISO ratings according to what they are going to photograph. For example, to photograph a landscape on a sunny day, with the camera mounted on a tripod, you would set the camera to its lowest ISO number, probably ISO 100. To photograph a football match under floodlights with the camera hand-held, you would set the camera to its highest ISO number, probably ISO 3200.