

Topic 84

Aspect Ratio

The **aspect ratio** of an image describes the proportional relationship between its width and its height. It is commonly expressed as two numbers separated by a colon, as in 16:9.

Why aspect ratio matters

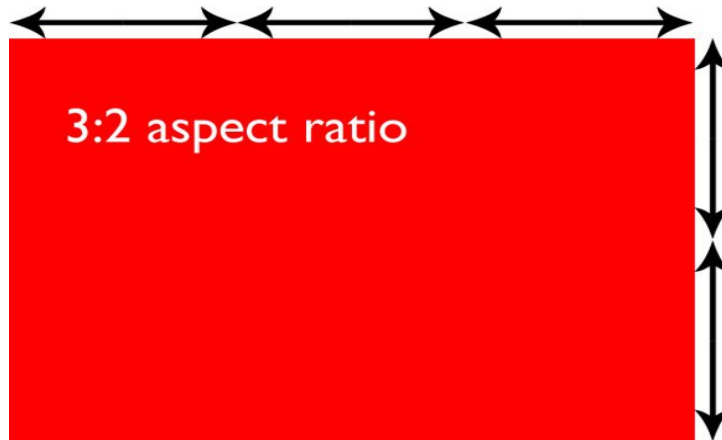
Why does aspect ratio matter? It's all to do with the relationship of the main subject to the sides of the frame, and the amount of empty space you end up with around the subject.

An awareness of the characteristics of the aspect ratio of your particular camera can help you compose better images. It also helps you recognise when cropping to a different aspect ratio will improve the composition of your image.

What is aspect ratio?

Aspect ratio describes the relationship between the width and height of an image. It's written as a figure, in this form – width:height (width always comes first).

Virtually every digital camera comes with a sensor of one of two aspect ratios:



An aspect ratio used by 35mm crop sensor and full-frame SLRs, some Leica medium format cameras, mirror-less cameras, high end compacts and most 35mm film cameras. This aspect ratio has been with us ever since Leica made the first 35mm film cameras early last century.

35mm crop sensor and full-frame SLRs have an aspect ratio of 3:2. The sensor is 1.5 times as wide as it is high.

A full-frame 35mm sensor measures 36 x 24mm. You can express this figure as a ratio: 36:24. Mathematicians always like to simplify ratios so that the relationship between the two numbers is easy to visualise. In this case, you can divide both dimensions by twelve. That gives you 3:2.

Crop sensor cameras have smaller sensors, measuring approximately 22.5 x 15mm (the exact measurements vary, depending on brand and model). These figures conform to the 3:2 aspect ratio of the full-frame sensor.

Examples

The most common aspect ratios used today in the presentation of films in cinemas are **1.85:1** and **2.39:1**. Two common videographic aspect ratios are **4:3** (1.33:1), the universal video format of the 20th century, and **16:9** (1.77:1), universal for high-definition television and European digital television. Other cinema and video aspect ratios exist, but are used infrequently.

In still camera photography, the most common aspect ratios are **4:3**, **3:2**, and more recently being found in consumer cameras **16:9**. Other aspect ratios, such as **5:3**, **5:4**, and **1:1** (square format), are used in photography as well, particularly in medium format and large format.

With television, DVD and Blu-ray Disc, converting formats of unequal ratios is achieved by enlarging the original image to fill the receiving format's display area and cutting off any excess picture information (zooming and cropping), by adding horizontal mattes (letterboxing) or vertical mattes (pillarboxing) to retain the original format's aspect ratio, by stretching (hence distorting) the image to fill the receiving format's ratio, or by scaling by different factors in both directions, possibly scaling by a different factor in the center and at the edges (as in *Wide Zoom mode*).

Current video standards

1. 4:3 standard

4:3 (1.33:1) (generally read as "Four-Three", "Four-by-Three", or "Four-to-Three") for standard television has been in use since the invention of moving picture cameras and many computer monitors used to employ the same aspect ratio. 4:3 was the aspect ratio used for 35 mm films in the silent era. It is also very close to the 1.375:1 aspect ratio defined by the Academy of Motion

Picture Arts and Sciences as a standard after the advent of optical sound-on-film. By having TV match this aspect ratio, movies originally photographed on 35 mm film could be satisfactorily viewed on TV in the early days of the medium (i.e. the 1940s and the 1950s). When cinema attendance dropped, Hollywood created widescreen aspect ratios (such as the 1.85:1 ratio mentioned earlier) in order to differentiate the film industry from TV. However since the start of the 21st century broadcasters worldwide are phasing out the 4:3 standard entirely, as technology started to favor the 16:9/16:10 aspect ratio of all modern high-definition television sets, broadcast cameras and computer monitors.

2. 16:9 standard

16:9 (1.77:1) (generally named as "Sixteen-Nine", "Sixteen-by-Nine" and "Sixteen-to-Nine") is the international standard format of HDTV, non-HD digital television and analog widescreen television PALplus. Japan's Hi-Vision originally started with a 5:3 (= 15:9) ratio but converted when the international standards group introduced a wider ratio of $5\frac{1}{3}$ to 3 (= 16:9). Many digital video cameras have the capability to record in 16:9, and 16:9 is the only widescreen aspect ratio natively supported by the DVD standard. DVD producers can also choose to show even wider ratios such as 1.85:1 and 2.39:1 within the 16:9 DVD frame by hard matting or adding black bars within the image itself.