



Aspect Ratio and Anamorphic

Aspect ratio

Aspect ratio is a ratio or calculated ratio of an image width by the image height. Aspect ratios are usually stated as 4:3, 4x3 or a number such as 1.33. For example standard NTSC video (cable TV) has a 4:3 or 1.33 aspect ratio. This means that the image is wider than it is high by a factor of 1.33 or 4:3. A 100" diagonal 4:3 screen (our most popular projector screen size) has an image width of 80" and a height of 60". A 25" TV maintains the same aspect ratio, just with smaller dimensions. Older films generally kept the aspect ratio of 4:3 until the 1950's when various filmmakers began to experiment with other aspect ratios to give their films unique acceptance. TV makers decided to keep 4:3 as its aspect ratio, which had been the only video aspect ratio until widescreen began in the 1980's. The 1990's ushered in 16:9 video, which is quickly becoming popular in upscale TV's and projection. Selected Knöll projectors can display various aspect ratios on different screen sizes to more closely preserve the original aspect ratio of films and videos.

At this time video enjoys four popular aspect ratios. 4:3 (1.33) is by far the most common. Widescreen aspect ratios are a group of aspect ratios between 1.85 and 2.35 and are usually displayed at 1.85. 16:9 (1.78) is the next most common aspect ratio and will likely become the standard for HDTV and possibly DTV as well. 2.35 is the last popular aspect ratio for video (many feature length films are made in 2.35) but it is usually displayed on a tube or screen made for 16:9 or 4:3 aspect ratios.

Anamorphic

Anamorphic filming technology has been available for several decades. Simply stated when a movie with an aspect ratio of higher than 1.33 (usually 1.85 to 2.35) is filmed, a distorting lens is placed on the camera filming the movie to compress the image so it will fit on the standard 1.33 film. When the movie is played back a reversing distortion lens is placed on the film projector to give the higher aspect ratio image from 1.33 film.

In video reproduction the anamorphic concept can be electronically applied to images resulting in a sharper, higher definition, higher aspect ratio (almost always 1.78) image. When the high aspect ratio image is recorded (on a DVD or other medium) it is deliberately distorted making the people in the image tall and thin to completely fill the 1.33 aspect ratio even though the image actually has an aspect ratio of 1.78. In the case of NTSC, we have removed the black box above and below the image and used up more than 500 lines of resolution instead of the maximum 300 or so lines of resolution available in widescreen.

When the image is displayed, the projector has to be set to the correct aspect ratio of 16x9 (1.78) and the deliberately distorted 1.33 image is "squashed down" to the 1.78 aspect ratio height, restoring the people to their correct dimensions. In this way we are displaying about 500 lines of resolution in the space of the center horizontal 300 and artificially adding black boxes above and below the image.

It is important to note that both the source and the projector have to be set to 16x9 (1.78) or serious image distortion will occur.

Fig.1

This movie clip is shown in NTSC 16:9 (1.78) anamorphic. Note the apparent great picture definition and near lack of scan lines. It is shown on a 16x9 screen. Both the image source and the projector have to be set to 16:9 aspect ratios.



[Click here to see different aspect ratio and anamorphic images.](#) This is a large set of images and slower modems may take some time to transfer them.

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