Format	Aspect Ratio	Dimensions	Description	Area
35 mm 2 perf	2.40:1	.868 × .365 in 22.05 × 9.27 mm	35 mm 2-perf Camera Aperture	204.4 mm²
	2.40:1	.825 × .345 in 20.96 × 8.76 mm	35 mm 2-perf Extracted Area for 2.40:1 Release	183.6 mm²
	1.78:1	.614 × .345 in 15.60 × 8.76 mm	35 mm 2-perf 1.78:1 Transmitted Area	136.7 mm²
35 mm 3 perf	various	.980 × .546 in 24.92 × 13.87 mm	Super 35 mm 3-perf Camera Aperture *Some formats that can be captured 3 or 4 perf:* *Super 35 mm 2.40 [.945 × .394 in]* *Super 35 mm 1.85 [.945 × .511 in]* *Super 35 mm 1.78 [.945 × .531 in]*	345.6 mm²
35 mm 4 perf	1.33:1	.792 × .594 in 20.12 × 15.09 mm	35 mm TV Transmitted Area *(SMPTE recommended practice)*	303.6 mm²
	1.33:1	.832 × .624 in 21.13 × 15.85 mm	Super 35 mm "Large" TV Transmitted Area	334.9 mm²
	1.85:1	.825 × .446 in 20.96 × 11.33 mm	35 mm 1.85:1 Projection Aperture	237.5 mm²
	1.85:1	.945 × .511 in 24.00 × 12.98 mm	Super 35 mm Extracted Area for 1.85:1 Release	311.5 mm²
	1.78:1	.945 × .531 in 24.00 × 13.50 mm	Super 35 mm 1.78:1 Transmitted Area	324.0 mm²
	2.40:1	.945 × .394 in 24.00 × 10.04 mm	Super 35 mm Extracted Area for 2.40:1 Release	241.0 mm²
	2.40:1	.825 × .690 in 20.96 × 17.53 mm	35 mm Anamorphic Projection Aperture	367.4 mm²
	1.37:1	.980 × .735 in 24.92 × 18.67 mm	35 mm Full Camera Aperture	465.3 mm²

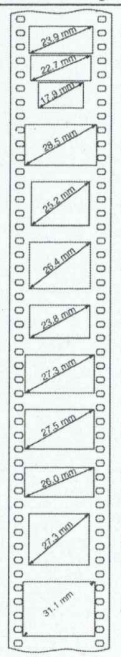

Figure 1.10 35 mm aspect ratios. (Courtesy of Panavision Inc.)

Format	Aspect Ratio	Dimensions	Description	Scale Drawing	Area
65 mm 70 mm	2.20:1	2.072 × .906 in 52.63 × 23.01 mm	65 mm Camera Aperture	57.4 mm 1211.0 mm²	
	2.20:1	1.912 × .870 in 48.56 × 22.10 mm	70 mm Projection Aperture *(Panavision Super 70 mm)*	52.6 mm 986.3 mm²	
	2.40:1	1.912 × .800 in 48.56 × 20.31 mm	Extracted for 2.40:1 Release		

Figure 1.11 65 mm/70 mm aspect ratios. (Courtesy of Panavision Inc.)

be ordered for the camera. See Figures 4.28 and 4.29 in Chapter 4 for examples of the ground glass found in both Arriflex and Panavision 16 mm and 35 mm cameras. For many of these the ground glasses are marked for multiple formats.

Some camera manufacturers have recently developed 35 mm camera systems that are designed to reduce film waste. Instead of the standard four perforations per frame, these systems use three perforations per frame of 35 mm film, resulting in a 25 percent savings in film use. When shooting 1.85:1 aspect ratio and even 1.78:1 aspect ratio, and using 4-perf 35 mm film cameras, the top and bottom part of the film frame are wasted. By using 3-perf cameras there is almost no wasted film. Check with the camera rental company for the availability of 3-perf pull-down cameras (see Figure 1.12).

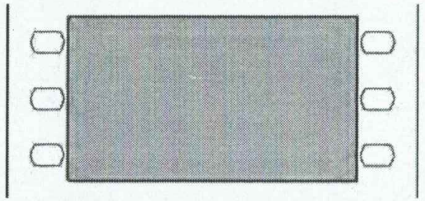

Figure 1.12
Example of 1.85:1 aspect ratio when shooting 3 perf. (Courtesy of Panavision Inc.)

F-STOPS AND T-STOPS

All motion picture lenses contain an adjustable iris, sometimes referred to as an aperture or diaphragm, to control the amount of light that enters the lens and strikes the film. You can compare this to the iris in the human eye. A wide opening allows more light in to strike the film than a small or narrow opening. The number that refers to the size of this opening is called an *f-stop*. It is a mathematical calculation equal to the focal length of the lens divided by the diameter of the aperture opening. The standard series of f-stop numbers is 1, 1.4, 2, 2.8, 4, 5.6, 8, 11, 16, 22, 32, and so on. In theory, the f-stop numbers go infinitely in both directions. All lenses are marked along the barrel of the lens with these f-stop numbers. By turning the diaphragm or iris adjustment ring on the lens barrel to a specific number, you are adjusting the size of the iris diaphragm within the lens and controlling how much light gets through to the film. You can think of this adjustable-lens iris as being similar to the iris and pupil in your eye. In a low-light or dark setting your pupil gets larger to let in more light, and in a very bright setting your pupil gets smaller to let in less light.

Each f-stop admits half as much light through the lens as the f-stop before it. In other words, an f-stop of 4 admits through the lens half as much light as an f-stop of 2.8. Conversely, each f-stop admits twice as much light through the lens as the f-stop after it. In other words, an f-stop of 5.6 admits through the lens twice as much light as