

# Chapter 1. Film

If you ask five different people what film is, you'll probably get five different answers. The only one that matters is that film is a thin, flexible plastic strip coated on one side with gelatin emulsion.

## The plastic base

The first cinematic film was cellulose nitrate, generally called 'nitrate'. It was very flammable and had to be stored and handled with great care. But because 16 mm film was originally intended for amateur and home use, it used cellulose triacetate ('acetate') or 'safety' film base from its introduction in 1923. 'Acetate' does not pose the same dangers as 'nitrate' but it warps, buckles, curls and becomes brittle in time.

For the past 30 or so years, polyester has been used as the plastic base in all formats. It is immensely strong and safe. It takes longer to break down and go brittle than nitrate or acetate. But it is affected by heat, dust, excess humidity and dryness, is easily scratched and damaged and will curl, warp and buckle, just like its predecessors.

Most 16 mm films available for screening are polyester based, but older films which haven't been transferred to polyester are acetate, which may be brittle and need very careful handling.

## The emulsion

The gelatin emulsion is soft, soluble and easily scratched. The emulsion carries the photographic images in units called frames, which are separated by frame lines. The images comprise varying quantities of silver, for black and white film, and layers of dye for colour. The various chemicals all deteriorate over time, but generally black and white films are more stable.

The emulsion also carries the optical soundtrack, which is a wavy line that travels along one edge of the film. The holes along the other edge are called 'perforations'. These are accurately punched in the film to engage the projector's sprocket teeth as they rotate, so the film can be moved through the projector at a constant speed.

### *Your turn*

*Unroll some film from a reel until you can see some images. Look at both sides and see if you can pick which is the emulsion side. Tip: (1) The emulsion side is generally duller. (2) The old test was to lick your bottom lip and quickly touch one side of the film to it. If the film tended to stick to your lip that was the emulsion side. If it didn't, the emulsion was on the other side. This practice is not advisable on screening prints. If you try it, be careful. Unless you are quick, the emulsion can adhere to your lip and be difficult to remove.*

## Handling and storage

Other chapters cover the handling of film in detail. The most important thing to remember is that film is easily damaged. A couple of old projectionist's rules are worth remembering: 1. Never let the film touch the floor, and 2. Never try to clean the emulsion side, and especially not with water (the emulsion is soluble).

Storage conditions for film are critical. Individual reels should be stored in their own cans and kept in a cool, dry place with minimum temperature fluctuations. Black and white films should be stored at between 15° and 18° C. The ideal temperature for colour film is much lower, 8° C degrees or less. Water is a serious hazard to film and can destroy it. The presence of even small amounts of moisture encourages the growth of moulds that attack the emulsion and the film base. Refrigerators are not recommended for film storage, as their internal atmospheres contain high levels of moisture. Different experts have divergent views on how film should be stored on the reel. Some say it should be wound on tightly. Others say it should be wound on at fairly loose tension for storage then rewound at higher tension before screening. If you are preparing to store film long term, it is arguably better tightly wound, as this is likely to help prevent moisture, dust and moulds entering spaces created by a loose wind. (Refer also to information on vinegar syndrome in *Part 3*.)