Film on Film

Quick Guide

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Why (Do People) Shoot on Film?

As of 2020, More Hollywood productions than ever before are choosing to shoot on motion picture (celluloid) film. The last major producer of this format so integral to the history of film and television, is Kodak.

Choosing the Correct Film Gauge

When it has been decided to shoot the production on film, one of the earliest considerations to make is what film gauge (or gauges) to shoot on. This decision is the culmination of a few important factors which are typically more or less clear towards the start of the development and pre-production phases. The factors to inform what gauge(s) you will shoot on for the production are usually as follows:

- **Budgetary Restrictions** (*or indeed allowances*)
    - This is usually the primary limiting factor when it comes to deciding what film gauge, let alone how much, to order. The larger the format, the more expensive that stock, processing, scanning and peripheral processes will be. If you are shooting a low-budget, independent short film - you will probably only be able to shoot on *8mm* or *16mm*. Conversely, if the budget is not a problem and you are working on a medium-length documentary or major feature-length film destined for theatrical release (*cinemas*), then you will likely want to shoot on one of the larger, theatrical formats - *35mm* or *65mm*.
- **Overall (End) Destination for the Film**
    - This is usually apparent at the very earliest stages of commissioning or development - *where* is your film going to be *seen*? and - particularly in today's film and media climate - where there are numerous ancillary markets (*i.e home video, online streaming, SVOD/VOD etc*), what are the various destinations of your film besides the cinema? Or, your film may not be destined for festivals or theatrical release, in which case - *should* you be shooting on film? There are many considerations to be had here about the marketability, not to mention financial viability, of shooting and projecting on film.
- **The Aesthetic: Initial Considerations**
    - It is perhaps frustrating to some that the aesthetic consideration is usually the third factor which contributes to overall decisions on what film gauge to shoot on. Consider the very real possibility that, as DOP and/or Director, you may find that *your* personal desire to shoot on film may likely be at odds with that of the producer's (or production's) desire - and of course, what is financially possible. Hopefully, your producer/production department will be entirely supportive of your desire to shoot on film, and will help support your film gauge(s), stock type(s) and camera choices.
    - Similarly with Digital Cinematography, the 'aesthetic' (*or 'aesthetics'*) of a film are usually the culmination of a series of creative meetings and discussions between all heads of department (HOD), chiefly among those key creative personnel are the discussions between the Director and Director of Photography. Where possible it is a good rule of thumb to have everyone attend relevant aesthetic meetings; particularly if (*which is the case anyway*) the aesthetic decisions will impact or otherwise influence every other HOD's creative input and vice versa to the camera team. The Production Designer will need to know what film stocks are being used so they can find the right colours and textures of set design and furnishings, hair and make-up and of course: costume. Latterly, the editor and colourist will need to know the film's aesthetic(s) so they can setup and anticipate a suitable creative and technically sound workflow for post-production
- **The Aesthetic: Selection**
    - The Aesthetic(s) of a film (*shot on film*) are very important. Whereas Digital Cinematography of today allows for a virtually endless array of combinations and technical opportunities, to modify the aesthetic at any point from shooting right through post-production, shooting on real film is definitive - it is the process of celluloid reacting to being exposed to light, as it passes through the camera's gate, which is a chemical process. Though film is often scanned so it appears in the editing room as a kind of raw, log image - the image you see (*minus some relatively straightforward colour correction if you have indeed graded celluloid-shot films before*) is the image you're going to get and ultimately project.

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Choosing a Film Gauge			
Production Type	**Genre**	**Destination**	**Common Shooting Formats**
Major (*High Budget*)	Feature Film	Theatrical (Cinema) + Streaming/VOD	65mm / 35mm / Digital
Indie (*Medium Budget*)	Feature Film	Theatrical (Cinema)	35mm / Super 16mm / Digital
Indie (*Low Budget*)	Feature Film	Streaming/VOD + Home Video Formats	Digital
Indie (*Medium Budget*)	Short Film	Cinema Premiere + Streaming/VOD	Super 16mm / Digital
Indie (*Low Budget*)	Short Film	Online Only	Digital
Indie (*Low Budget*)	Micro Short	Online Only	Digital
Indie (*Low Budget*)	Online Video/Vlog	Online Only	Digital

There are four common film gauge standards for motion picture film currently, here is a short backstory for each:

65/70mm and **35mm** are the two theatrical (*cinema exhibition*) formats, with 35mm being much more commonplace in cinemas, if they are indeed equipped with film projection systems. There are nowhere near as many cinemas equipped to project on film as there are digital, which has been the case for quite some time. 70mm is historically considered to be a speciality format reserved for epics and 'spectacle' films as well as blockbuster films released both in 35mm and as 70mm blow-ups. There has been a recent resurgence in 70mm production and indeed exhibition largely due to the efforts of some contemporary big-name directors such as *Christopher Nolan*, *Paul Thomas Anderson* and *Quentin Tarantino*, shooting in this grand format.

70mm is extremely expensive to shoot on, process and scan - not to mention the enormous complexity involved in handling the film through the post-production pipeline by technicians, machines and facilities. **35mm** is comparatively not as expensive as 70mm in most regards but is up to four times more expensive than 16mm due to the processes involved, which is why 35mm production is often reserved for major feature films. Some indie feature films and short films (*albeit very rarely*) may also be shot on 35mm, though the costs and the budgetary brackets these modes of production take don't often qualify for the training, costs and overall processes which film necessitates.

16mm on the other hand is a historically popular and economical gauge of film and was (and still very much is) generally used for non-theatrical film-making such as that found in film school environments. It also existed as a popular amateur and home movie-making format for several decades, alongside **8mm** and later **Super 8mm** film.

Currently, _____

Choosing the Correct Amount of Film

Considering to shoot on celluloid, as opposed to (*or in conjunction with*) digital cinematography, should be one of the earliest considerations in pre-production which will coincide and be of relevance at around the time that planning is underway by the AD (assistant director) and Locations Departments. This is so that as the Director of Photography (*and principal creative & technical advisor to the production of all things 'camera'*) you are as fully informed as you can be about the following:

- **The scenes that need to be shot**
    - If you are shooting a short film, you won't need nearly as much film stock as that of a feature-length production - for obvious reasons.
    - Whilst the number of scenes are important to an extent, in regards to working out an estimate of the amount of film stock you will need - the key deciding factors will likely come from the time given to film the scenes, the locations in which they are being filmed in (*and how this might affect time - logistically and in terms of film footage shot*), as well as the all important final estimated running time of the entire film - usually, though not always, obvious from the length of a script. The typical rule of thumb is one page of script equating to one minute of screen time.
- **The time allocated by the ADs / Production in which to shoot those scenes**
    - This particular variable is important so that you know *how much* film stock (of a particular stock type) to submit an order for.
    - Long dramatic scenes, especially with lots of coverage (camera angles), will demand a lot of film stock - as will multiple takes and pick-ups of the same action.
    - The shooting schedule is likely to continue evolving all the time as the shoot progresses through pre-production through to shooting itself, and any pickups or 2nd Unit Photography undertaken too. These changes may demand you revise the concurrent estimations for any new film stock being ordered/shipped or processed and scanned.
- **The location(s) which the scenes will be shot at/in**.
    - It is well worth bearing in mind that Outdoor Shooting Locations usually come with somewhat undesirable variables such as *wind, ambience of nature, pedestrians, crowds, vehicles, machinery and so on*.
    - These variables will most likely come at the expense of eating away the acquired footage so make sure to compensate not just for additional coverage and takes but location shooting - and all that comes with it, as well. For example, a two-character dialogue scene interrupted mid-way through by wind (*perhaps affecting sound and HMU*), will likely cause the scene to be cut, rendering most (*if not all*) of the take unusable.
    - Nearly All Location Shooting, especially with unfavourable weather/noise conditions, will likely eat up a lot of film footage so keep an eye on that and be sure to order contingency stock. If the production is shooting on 'film' and your budget is limited, try to emphasise the importance of avoiding these undesirable variables to the production or location manager to try and book locations which might favour shooting on film.
- **The shooting ratio**
    - This is something a bit different, and will likely emerge (though hopefully not) throughout shooting. The Shooting Ratio, (*usually the result of precursory meetings with Director, DOP, Producer and Editor*) is a rough but calculated estimate on how much (footage) the production shoots physically versus how much of that footage will get used in the final cut.
    - Shooting Ratios are determined by a small number of key factors, including the aforementioned points about number of scenes, time allocated and locations which are all important variables. The most important variable which determines the Shooting Ratio is the actors' (*and camera's*) performance.
    - The film's dramatic success lies not least on the actors' cumulative and overall performances and the Shooting Ratio may be greater, the *lesser* the experience of the actors - (*which is not so great for the production's budget, not to mention time and energy of other cast and crew*). It is typical for productions which star A-List artistes and performers to have a low or sometimes very low (i.e 2:1) Shooting Ratio, in part due to the experience, but

also the sophistication of the production's and time/money constraints which demand such levels of efficiency and organisation.
    - The Shooting Ratio may be further widened as a result of some of these other highly important variables:
        - The chances of extra takes being unexpectedly added versus how hard (*or how likely this is*) to result in a good/sufficiently usable performance. There is never an instance where 'over-doing it' is a good thing, even if you're a so-called visionary and demand perfect shots. This can all be achieved with a healthy amount of shooting, if (*and only if*) sufficient planning in pre-production has been carried out.
        - Performance does not always mean the actors getting through a scene without blowing their lines and giving a '*usable*' performance; it can and should allow some time for that '*special something*' to happen, the tiny variation that moves the scene (and film) up a gear.

Though every production has its own unique demands, there are general codes and conventions which can be applied in order to get a sufficient estimate for the amount of film stock required to complete the film.

These are the considerations / phases which require film stock for an indie feature or major feature production. They may also apply to an independent short film shooting on celluloid, however '*ballpark*' budgets in this mode of filmmaking don't tend to provide the level of financial backing to proceed with ordering film stock for these additional, yet important, phases.
Short Films, shot on film, often (only) consider the film stock required to shoot the film itself.

- **Camera Tests**
    - film stock required for testing different stock types: either at the kit/rental house, in studio or on-location. These tests might also involve stand-ins, the actor(s) themselves or real locations/scenes.
- **Principal Photography**
    - film stock required to film the shots and scenes which form the finished film. Principal Photography involves the key cast, key locations and <u>does not</u> usually include landscape shots (*known as 'General Views' or GVs for short*) and peripheral action or montages which can be (*and is usually*) completed by the 2nd Unit, formed of a smaller/skeleton crew.
- **2nd Unit Photography**
    - film stock required to film 2nd Unit Material; the 2nd Unit may be shooting straight after Principal Photography has wrapped or simultaneously in another location.
- **Pick-Ups** (*aka Re-Shoots*) - film stock required to film any pick-ups (otherwise known as re-shoots) which may become a necessity during editing. Contingency Film Stock for pick-ups should be considered at the earliest possible stage, even if pickups are not likely (or not *thought* to be likely) needed.

Here are the reminders of the variables:

Phase	> Base Estimation of Stock (ft) >		> Fine Estimation of Stock (ft) >	
Item	**Estimated Running Time of Film**	**(Logistical) Time To Shoot**	**(Un)desirable Variables During Shooting + Contingency Stock**	**Shooting Ratio**
Dictated By?	How many pages does the script have OR what has the production said it is likely to be?	How much time has the production given for shooting each scene, as well as the overall number of shoot days?	Such as Location Variables or Equipment/ Technical Failures AND Contingency Stock for Pick-Ups (Re-Shoots).	Previous Considerations + An estimate of how much you shoot versus what ends up being used in the final edit, as a ratio

				(*i.e 5:1 - 5-to-1*)

Now with a Shooting Ratio hopefully calculated, formed of numerous considerations as mentioned prior, you need to confirm an estimate of the stock required, to the production / payroll accountant, before choosing specific stock types, as detailed in the section below. It is worth reading

Shooting Ratio Calculator (Film) - *Based on 24fps*								
Production Type	Film Type	Est. Running Time of Finished Film (*minutes*)	Shooting Days (*no. of days*)	Shooting Ratio (*shoot vs edit*)	Film Gauge	Footage Needed (*ft*) **Roll (*ft.*)**	**Qty.**	**Total (*ft.*)**
Major	Feature	150"	140	12 : 1	65mm 35mm Super 16mm Std. 16mm	1000ft 400ft 400ft 100ft	x200	100,000
Major	Feature	120"	120	10 : 1	65mm 35mm Super 16mm Std. 16mm	1000ft 1000ft 400ft 100ft		
Major	Feature	90"	100	6 : 1	35mm Super 16mm Std. 16mm	1000ft 400ft 100ft	X45	
Indie	Feature	90"	80	4 : 1	35mm Super 16mm Std. 16mm	400ft 400ft 100ft	X40	
Indie	Feature	75"	45	3 : 1	35mm Super 16mm Std. 16mm Super 8mm Std. 8mm	400ft 400ft 100ft 50ft 50ft		
Indie	Short	30"	15	3 : 1	35mm Super 16mm Std. 16mm Super 8mm Std. 8mm	400ft 400ft 100ft 50ft 50ft	X12	
Indie	Short	25"	12	3 : 1	Super 16mm Std. 16mm Super 8mm Std. 8mm	400ft 100ft 50ft 50ft	X10	
Indie	Short	15"	7	3 : 1	Super 16mm Std. 16mm Super 8mm Std. 8mm	400ft 100ft 50ft 50ft	X6	
Indie	Short	10"	4	3 : 1	Super 16mm Std. 16mm Super 8mm Std. 8mm	400ft 100ft 50ft 50ft	X4 X16 X32 X32	1,600
Indie	Micro-Short	3"	2	1 : 1	Std. 16mm	100ft		

					Super 8mm Std. 8mm	50ft 50ft	X2 X2	
Major	Commercial	1"	3	4 : 1	35mm Super 16mm Super 8mm	400ft 400ft 50ft	X2 X4 X16	1,600 800
Indie	Commercial	1"	1	2 : 1	Super 16mm Super 8mm	400ft 50ft	X2 X8	800 400

Selecting Stock Type(s) & Example (Camera Test) Reels

As mentioned previously, before you begin selecting stock types, you need to work out the physical amount of film negative stock (in feet). Once this is done, you can start browsing to your heart's content. Whether you're looking for a specific creative aesthetic or just enjoy the processes of film, understanding film stock options (stock types) will help you in this stage of the creative process.

Here are the considerations to make in order to work out what stock types you need to acquire:

- **Where are you shooting? On Location, Set/Studio or Both?**
  - If Location, you will likely need to use Daylight-balanced film stock (*i.e 50D, 100D, 250D*)
  - If Studio, you will likely need to use Tungsten-balanced film stock (*i.e 250T, 500T*). Tungsten (or artificial light) sources such as lamps are often considered to offer more control of the lighting, especially on a set.
  - If Both, you will likely need to order a combination of stock types in respect to how many scenes are either shot on Location or shot Studio-based.
- **You and your director's creative intentions**
  - Once you've considered a few of the practical limitations, you can then consider creative intentions which will best serve the film's aesthetic look(s) and overall narrative.

Title	Description	Image
KODAK Vision3 50D Colour Negative Film	• Daylight-balanced film stock • Ideal for bright, daylight, exterior scenarios with a torrent of light • Finest Grain Structure • Clean, crisp and stable image • Worthy of archival applications • Available in 8mm, 16mm and 35mm	
KODAK Vision3 250D Colour Negative Film	• Daylight-balanced film stock • Ideal middle-of-the-road film stock, sensitive enough to use indoors with plenty of natural light, or outdoors without risk of overexposure. • This stock's lower sensitivity offers a cleaner grain structure than 500T • Available in 16mm and 35mm	
KODAK Vision3 200T Colour Negative Film	• Tungsten-balanced film stock • Introduces reduced grain and vibrant colour renditions • Perfect for studio applications with tungsten lighting fixtures, this stock creates a cinematic and filmic image. • Available in 8mm, 16mm and 35mm	

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KODAK Vision3 500T Colour Negative Film	• Tungsten-balanced film stock • Ideal for indoor applications, when available light is more limited. • Beautiful grain structure to complement its low-light performance. • Good all-rounder for independent film or documentary stock, as it is versatile. • Available in 8mm, 16mm and 35mm	
Ektachrome 100D Colour Reversal Film	• Daylight-balanced film stock • The stock creates a unique blend of vibrant, saturated colours • Ideal for outdoor scenarios with plenty of light. • Only available in Super 8 and 16mm options.	
TRI-X Black and White Reversal Film	• High-speed, panchromatic black and white film. • Fine grain and sharpness suitable for general interior photography with artificial light / controlled light	
Eastman Double-X B&W Negative Film	• Black and White Film with a traditional, classic look. • Subtleties in tone scale • Designed for general production use outdoors and in the studio, in dim light, and anywhere where greater depth of field is needed, without increased illumination.	

Example (Camera Test) Reels

Here are some examples of shorts or test reels shot on different film stock types.

Super 8mm	LINK	Standard 16mm	LINK	Super 16mm	LINK
Kodak Vision3 50D Neg.	DAY NITE	Kodak Vision3 50D Neg.	DAY NITE	Kodak Vision3 50D Neg.	DAY NITE
		Kodak Vision3 250D Neg.	DAY NITE	Kodak Vision3 250D Neg.	DAY NITE
Kodak Vision3 200T Neg.	DAY NITE	Kodak Vision3 200T Neg.	DAY NITE	Kodak Vision3 200T Neg.	DAY NITE
Kodak Vision3 500T Neg.	DAY NITE	Kodak Vision3 500T Neg.	DAY NITE	Kodak Vision3 500T Neg.	DAY NITE
Ektachrome 100D Rever.	DAY NITE	Ektachrome 100D Rever.	DAY NITE	Ektachrome 100D Rever.	DAY NITE
TRI-X B&W 160/200 Rev.	DAY NITE	TRI-X B&W 160/200 Rev.	DAY NITE	TRI-X B&W 160/200 Rev.	DAY NITE
		Eastman Double-X 200/250 Negative Film	DAY NITE	Eastman Double-X 200/250 Negative Film	DAY NITE

35mm 3-perf	LINK	35mm 4-perf	LINK	65mm	LINK
Kodak Vision3 50D Neg.	DAY NITE	Kodak Vision3 50D Neg.	DAY NITE	Kodak Vision3 50D Neg.	DAY NITE
Kodak Vision3 250D Neg.	DAY NITE	Kodak Vision3 250D Neg.	DAY NITE	Kodak Vision3 250D Neg.	DAY NITE
Kodak Vision3 200T Neg.	DAY NITE	Kodak Vision3 200T Neg.	DAY NITE	Kodak Vision3 200T Neg.	DAY NITE
Kodak Vision3 500T Neg.	DAY NITE	Kodak Vision3 500T Neg.	DAY NITE	Kodak Vision3 500T Neg.	DAY NITE
Eastman Double-X 200/250 Negative Film	DAY NITE	Eastman Double-X 200/250 Negative Film	DAY NITE		

KODAK *Sell Sheets* & (Technical) *Data Sheets*

KODAK want production companies, productions and their Directors of Photography to be fully informed about the differing qualities of the stock types they manufacture and sell on to clients to be used in film shoots. When browsing for Film Stocks from one of KODAK's authorised resellers in the country of production, two important resources are often not included. From the point of view of the authorised reseller of film stock, it is already assumed that the client ordering knows a sufficient amount of knowledge to inform them of the choice of stock they are going to order from them - hence no need for them to include *Sell Sheets* or *Data Sheets*. Furthermore, KODAK will update their own website's resources and documentation as stocks are improved, re-issued or introduced.

The *Sell Sheet* is a glorified menu of possibilities which can be achieved by using the respective stock type it describes. If you are new to film cinematography, then looking in detail at the *Sell Sheet* is a good idea to understand the technical and scientific properties of a film stock. If you are looking to advance your knowledge even further, then having a glance over the *Data Sheets* available is a good idea - although you won't find much more that isn't already on the *Sell Sheet*.

The *Sell Sheet* is usually introduced by a page describing the aesthetic properties of the respective film stock, followed by subsequent pages of information pertaining to how to look after, expose (*shoot*) and process the film. There is information on *Darkroom Recommendations, Processing Chemistry, Storage Recommendations, Exposure Index Values, Laboratory Aim Density, Colour Balance, Reciprocity, Identification, Grain* and *Sharpness.*

To view a Sell Sheet, just click on one of the Camera Film pages to see a specific stock, and it's *Sell Sheet* and *Data Sheet*.

Selecting Camera(s) & Camera Equipment

Now you're at the point where you can choose an appropriate camera system to accommodate the choices you've made and planned for thus far. You should already know the following:

- Film Gauge(s) - what gauge(s) of film are you shooting on?
- Amount of Stock Needed - How much footage do you need to shoot on?
- The Film's Aesthetic(s) - what is the film going to look like: (*colours, tonality, sharpness, etc...*)

- Stock Type(s) - what film stock(s) are you going to be shooting on?

Once you've confirmed the above steps, you will need to select a camera system (and the necessary equipment) to carry out the film shoot. Different camera systems have different benefits, and there is no motion picture film camera which can do absolutely everything possible. If you are working to a specific (*or possibly low-to-no*) budget, then it is worth making compromises to find a camera system you can afford to hire out. The most common necessity in a camera system is, of course, that it shoots the film gauge you are shooting on. It would be useless to get a 35mm camera system, considering the fact you are shooting on 16mm as it will not work. It is extremely rare (*even for major Hollywood motion picture productions*) for the production company to actually buy a camera system due to the huge costs involved, not least of all the ongoing maintenance and upkeep required to keep the camera in working order.

Selecting a Camera should not (*necessarily*) be dictated to by the stock types considered; since you should already be at the point where you know the amount of film being shot on daylight-balanced and tungsten-balanced stocks. Instead, considerations should be given to the camera system's technical abilities in being able to achieve what it is you set out to film. Veteran Directors of Photography and Camera Operators will already have their preferred systems they find useful to work with, however - newer and emerging Cinematographers may find it best to do sufficient research on different cameras and what each of them offers, as well as how they're different.

Some of the things you will be looking to consider in a camera, for your production needs, and obvious as they may seem are as follows:

- Does the camera shoot on the gauge you are shooting on?
- If 35mm, are you shooting in *2-perf*, *3-perf* or *4-perf* movements? Each one may need a different camera.
- What lens(es) is the camera compatible with?
- What accessories is the camera compatible with?
- How expensive is hiring out the camera system?; complete with equipment, lenses and accessories.
- How big are the magazines (*film reels*) that can be loaded? Is it *50/100/200/400/500/1000*? Ft.
- What is the viewfinder of the camera like?
- How compact / cumbersome is the camera?
- How lightweight / heavy is the camera system?
- Is the camera ideal for handheld shooting, action rigs or in conjunction with stabilizers/Steadicam?
- Does the camera record sync-sound or is it an MOS camera?
- Does the camera record in high-speed (*for slow motion*)
- Is the shutter manually and/or electronically adjustable?
- Does the camera have an integrated video tap and/or timecode?
- What are electronic accessories like and is what wireless controls are there, if any?

Negative Pull Downs & Aspect Ratios

It is very important to consider Aspect Ratios, not least of all from a technical standpoint. The negative aspect ratio (*the aspect of what you are filming*) will in most cases, on professional productions, be different than the final aspect ratio which will be projected. This is due to numerous reasons - chief of which is the need for standardisation. Creative considerations regarding *Aspects*, if it allows, should be had and may include some of the following:

- **Creating a Mood or Setting**
    - The film's negative/projection format *and* aspect ratios should always be considered as part of the same conversation. A *mood* or *setting* (*in terms of story, location and time period or any other narrative variable for that matter*) might naturally lend itself to being conveyed through a particular aspect ratio. A coming-of-age indie film about high school students or teenage romance will naturally lend itself to being shot for ***1.85:1*** - a popular choice for an

aspect ratio used frequently on 1980s coming-of-age films which popularised this sub-genre.
    - An *epic* or '*spectacle*' film which utilises vast landscape shots and/or features characters on an 'epic' expedition and journey, may be shot in **2.39:1** to give the audience a sense of the scale of locations and story. This technique may also be altered and used to create a juxtaposition between the vastness of locations (*and their literal spaces*) and the internal emotions, intimate lives or turmoil of characters therein - such as in Alfonso Cuaron's *Roma*.
    - Even more epic than 2.39:1, specifically reminding audiences of epics shot in this way in the mid 1950s to mid 1960s is, *Ultra Panavision 70*. This aspect ratio, previously unseen for many years, made a renewed debut with the advent of Quentin Tarantino's *The Hateful Eight which* was shot in 70mm in this format. It is one of the widest aspect ratios - at **2.76:1**
    - Contemporary Audiences have come to immediately associate '*old-looking*' films, (especially those which are black & white and are natively filmic or simulated 'to look like the film was shot *on film*') with the aspects of **1.33:1** or **1.37:1**.
- **Emulating A Different Time Period / Different Time Period(s)**
    - Generally speaking, different aspect ratios have been and somewhat are associated with specific periods in film and cultural history. Aspect Ratios such as *4:3* are, compared with films in *Flat* and *Scope*, significantly less seen and are therefore associated with silent and early sound cinemas.
    - Aspect Ratios can also serve as a prominent storytelling device to indicate a shift to a different time period. In Wes Anderson's *The Grand Budapest Hotel* this technique is used in three different time periods. **1.85:1** for the present day, **2.40:1** for when the story goes back in time to *1968* (*2.40:1 was used widely in the 1950s and 1960s*), and again - when the story is transported even further back to *1932*: the aspect changes to **1.37:1** (*the so-called 'Academy ratio' that became the studio standard in 1932*).
- **Emphasising A Change in Filming Medium to the audience for Nostalgic, Comedic** *or* **Dramatic Effect**
    - Test

A quick note on *Negative Aspect Ratios* compared with *Projection Aspect Ratios*: all films currently projected digitally (*the vast majority of cinemas globally*), are projected in <u>one</u> of three standardised aspect ratios.

- **1.85:1** (*DCI Flat*),
- **2.39:1** (*DCI Scope*),
- **1.90:1** (*DCI Full Container*)

The company which standardises specifications for common systems architectures in digital cinema is *Digital Cinema Initiatives (DCI)*.

The limited number of aspect ratios which are projected in cinemas is in contrast with the wide array of shooting formats and negative aspect ratios, and there are a few things about this to bear in mind. Most films shot digitally are shot using the *full-frame* of the camera's image sensor. This is so that the image can be manipulated in post-production such as re-composing or re-framing the scene. Even if the intended aspect ratio is *2.39:1 Scope*; shooting the full-frame allows the online editor to re-position the frame up or down to correct or enhance a take.

Contemporary films (*digital or film*) which seek to emulate one of the many old-fashioned aspect ratios and aesthetic looks found in earlier cinema often compose for either the classic ***4:3 (1.33:1)*** aspect *or* **1.37:1** (the native negative aspect found in *Standard 16mm* and also the standard pre-widescreen Academy ratio for *35mm*). Some recent and significant examples include *Bait* which was shot on a *Bolex* in *16mm* which was then enhanced to 4:3, which was then nested inside the *DCI Flat container* prior to and for projection.

With the multitude of aspect ratios and formats which exist, *DCI standards* exist to find a highly efficient technical common ground between the various types of editorial processes and subsequent deliverables which are post-produced today. Historically '*home-video*' and '*amateur*' film formats, such as *Super 8mm* and *16mm* have once again become adopted by a new generation of independent and auteur filmmakers looking to experiment with moving image as a medium and in other cases, incorporating such footage into other

mixed-media practice involving larger film formats (*Super 16mm, 35mm*) and digital cinematography. Contemporary feature-films incorporating these different film formats which (*collectively*) may have an approximate aspect ratio of *4:3*, are almost always projected in *DCI Flat*.

Yet again, films shot digitally can be yielded to have a different aspect after post-production than the one initially shot (*through re-framing etc*). Films shot in an analogue format *can* also achieve this, provided they film with a larger aspect ratio (*capturing a bigger image area*) than the final intended output for projection. Of course, this process costs more money to do than shooting on the same negative stock you intend to project on. Bear in mind again, any *8mm* or *16mm* format is *not* a theatrical standard and, if you intend to project 'on film', in one of these formats, in a cinema - they are highly unlikely to have the equipment to do so - unless you approach a specialist, repertory/arthouse venue.

Films shot on *Standard 16mm* or *Super 16mm*, if being shown in a cinema *on film*, will require a 35mm blow-up print to be produced. There are a few companies remaining which do this service, and, of the ones that do - it is usually a very expensive process.

The table below (*similar to the one below that*) contains a list of films with their respective Final (*Projection*) Aspect Ratio. A lot of these films, particularly those shot on *35mm* and *65mm*, were projected at a *different* aspect ratio than the aspect ratio they were filmed in - most commonly *2.39:1 (Scope)*, often seen in major motion pictures; such as Blockbusters, sprawling Sci-fis and Epics.

It is worth noting that contemporary films *made for IMAX*, such as the recent works (*Interstellar, Tenet*) of filmmaker Christopher Nolan, often feature *sections* of the film in different aspect ratios. This is really to '*show off*' the filmic spectacle of the format, which in turns provides sufficient marketability for the film and IMAX themselves to attract audiences to see it. Because of the expense and logistical demands of shooting in *IMAX 65mm*, often films will be advertised as being shot in full IMAX but really are only partly shot in those grandiose formats.

Camera Format	Films with a Final (*Projection*) Aspect Ratio of **4:3** or **1.37:1** (*usually in a Flat container*)	Films with a Final (*Projection*) Aspect Ratio of **1.85:1 (Flat) or IMAX**	Films with a Final (*Projection*) Aspect Ratio of **2.39:1 (Scope)**
Standard 8mm			
Super 8mm			
Standard 16mm	Slacker (1990) - 1.37:1 Clerks (1994) - 1.37:1 Following (1998) - 1.37:1 Bait (2019) - 1.33:1 (4:3)	Pi (1998) - 1.66:1 edited for 1.85:1 Primer (2004) - 1.85:1	
Super 16mm		The Squid and The Whale (2005) - 1.85:1 The Hurt Locker (2008) - 1.85:1 Moonrise Kingdom (2012) - 1.85:1 Fruitvale Station (2013) - 1.85:1 Carol (2015) - 1.85:1 Certain Women (2016) - 1.85:1 Jackie (2016) - 1.85:1 '76 (2016) - 1.85:1 Happy as Lazzaro (2018) - 1.85:1 Sorry We Missed You (2019) - 1.85:1 Summer of 85 (2020) - 1.85:1	Black Swan (2010) - 2.39:1 Suffragette* (2015) - 2.39:1 Mother* (2017) - 2.39:1
35mm 2-perf			La La Land (2016) - 2.39:1

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35mm 3-perf		Little Women (2019) - 1.85:1	Chemical Hearts (2020) - 2.39:1
35mm 4-perf		Phantom Thread (2017) - 1.85:1 The Lighthouse (2019) - 1.19:1 neg. projected at 1.85:1 Marriage Story (2019) - 1.66:1 neg. projected at 1.85:1 On The Rocks (2020) - 1.85:1	Uncut Gems (2019) - 2.39:1 Queen & Slim* (2019) - 2.39:1 Wonder Woman 1984(2020) - also partially shot in *IMAX 65mm* and projected in different aspect ratios.
65mm		The Master* (2012) - 1.85:1	Far and Away* (1992) - 2.39:1 Baraka (1992) - 2.39:1 Hamlet* (1996) - 2.39:1 Samsara (2011) - 2.39:1 Interstellar (2014) - 2.39:1 The Hateful Eight (2015) - 2.39:1 Tenet (2020) - 2.39:1

Examples of Films Fully (or Partially*) Shot on Different Camera Systems

Camera Format	**Stock Type** *(All Stocks used are **Kodak Vision3** unless otherwise indicated, i.e Fuji or Eastman etc)*	**Col/ B&W**	**Camera Brand/Model**	**Film Title** *(* = Partially Shot on the respective format, if mixture of film gauges and/or film & digital formats)*
Super 8mm		Both Color Color Color	 Beaulieu 4008	Mary Jane's Not a Virgin Anymore (1996) The Man Who Met Himself (2005) Sinister* (2012) How The Sky Will Melt (2015)
Std. 16mm	Eastman Double-X 7222 E.man Plus-X 7276 + Tri-X 7278 Vision2 50D 7201 + 200T 7217 Eastman Double-X 7222	Color B&W B&W B&W Color B&W	Arri Arriflex SR2 Arri Arriflex SR2 Arri Arriflex 16 BL Aaton XTR Prod + Bolex H16 Arri Arriflex 16 SR2 Bolex H16 SB	Slacker (1990) Clerks (1994) Following (1998) Pi (1998) Primer (2004) Bait (2019)
Super 16mm	Vision2 500T 7218 + 250D 7246 Fuji Eterna 250D + 500T Fuji Eterna Vivid 160T + 500T Vision3 200T 7213 Vision3 500T 7219 Vision3 50D/250D/200T/500T Vision3 250D 7207 Vision3 250D 7207 + 500T 7219 Vision3 200T 7213 + 500T 7219 Vision3 200T 7213 Vision3 250D 7207 + 500T 7219 Vision3 250D, 200T + 500T Vision3 200T 7213 + 500T 7219	Color Color Color Color Color Color Color Color Color Both Both Color Color Color Color	Arriflex 16 SR3 Aaton A-Minima + Aaton XTR Prod Arriflex 16 SR3 + Arriflex 416 Aaton A-Minima + Aaton Xterà Arri Arriflex 416 Arri Arriflex 416 Plus Arri Arriflex 16 SR3 + Arriflex 416 Arriflex 416 Plus Arri Arriflex 416 Plus Arri Arriflex 416 Plus Arri Arricam LT + Arriflex 416 Plus Arri Arriflex 416 Arri Arriflex 416 Aaton XTR Prod + Arriflex 16 SR3	The Squid and The Whale (2005) The Hurt Locker (2008) Black Swan* (2010) Moonrise Kingdom (2012) Fruitvale Station (2013) Carol (2015) Suffragette* (2015) Certain Women (2016) Jackie (2016) '76 (2016) Mother* (2017) Happy as Lazzaro (2018) Sorry We Missed You (2019) Summer of 85 (2020)
35mm	Vision3 250D 5207 + 500T 5219 Vision3 200T 5213 + 500T 5219 Vision3 500T 5219	Color Color Color	Panavision Panaflex MillenniumXL2 Panavision Panaflex MillenniumXL2 Arri Arricam LT + Arricam ST	La La Land (2016) Phantom Thread (2017) Little Women (2019)

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	Eastman Double-X 5222	B&W	Panavision Panaflex MillenniumXL2	The Lighthouse (2019)
	Vision3 500T 5219	Color	Arri Arricam LT + Arricam ST	Uncut Gems (2019)
	Vision3 200T 5213 + 500T 5219		Arricam LT/Arricam ST/Arriflex435	Marriage Story (2019)
	Vision3 250D 5207 + 500T 5219	Color	Panavision Panaflex MillenniumXL2	Queen & Slim* (2019)
	Various	Color	Arriflex 235 + Arriflex 435 + IMAX MSM 9802 + Panavision Panaflex MillenniumXL2	Wonder Woman 1984(2020)
	Vision3 200T 5213 + 500T 5219	Color	Arricam LT	On The Rocks (2020)
	Vision3 500T 5219	Color	Arri Arricam LT	Chemical Hearts (2020)
65/ 70mm	Eastman EXR 50D 5245 + EXR 100T 5248 + EXR 500T 5296 + EXR 250D 5297		Arri Arriflex 765 Bell & Howell Eyemo Panavis. Panaflex System 65 Studio	Far and Away* (1992)
	Eastman EXR 100T 5248 Eastman EXR 500T 5296		Mitchell AP-65	Baraka (1992)
	Eastman EXR 200T 5293 Eastman EXR 500T 5298		Arri Arriflex 765 Panavis. Panaflex System 65 Studio	Hamlet* (1996)
	Vision2 50d 5201 + Vision2 250D 5205 + Vision3 250D 5207 + Vision2 500T 5218 + Vision3 500T 5219		Fricke 65 Time-Lapse Panavision System 65 Panavision 65 HR Camera	Samsara (2011)
	Vision2 50D 5201 + Vision3 50D 5203 + Vision3 250D 5207 + Vision3 200T 5213 + Vision3 500T 5219		Panavision 65 HR Camera Panavision System 65 Studio Panaflex Millennium XL2 (35mm)	The Master* (2012)
	Vision3 50D 5203 + Vision3 250D 5207 + Vision3 500T 5219		Beaumont VistaVision Camera IMAX MSM 9802 Panaflex Millennium XL2 (35mm)	Interstellar (2014)
	Vision3 50D 5203 + Vision3 250D 5207 + Vision3 200T 5213 + Vision3 500T 5219		Arri Arriflex 765 Panavision 65 HR Camera Panavis. Panaflex System 65 Studio	The Hateful Eight (2015)
			Arri Arriflex 765 IMAX MKIII IMAX MKIV IMAX MSM 9802 Panavis. Panaflex System 65 Studio	Tenet (2020)

As of 2020, these are the most popular camera systems currently used in motion picture film production:

Camera Format	Brand	Model	Magazine Loads (ft)	Run. Time 24fps (25fps)	First Introduced	UK Supplier
Standard 8mm				16fps: 18fps: 24fps:		
Super 8mm	Beaulieu	4008	50' (ft)	18fps: 03:20 24fps: 02:46	1971-77	Not Nowhere
	Canon	310 XL	50' (ft)	18fps: 03:20 24fps: 02:46	1975-83	
	Canon	514 XL	50' (ft)	18fps: 03:20 24fps: 02:46	1976-83	
	Canon	1014 XL-S	50' (ft)	18fps: 03:20	1978-83	

				24fps: 02:46		
	Nizo	S800	50' (ft)	18fps: 03:20 24fps: 02:46	1974-77	DV Camera Hire
Double Super 8mm						
Standard 16mm	Arri	Arriflex 16BL	400' (ft)	24fps: 11:06 25fps: 10:40	1965	
	Arri	Arriflex 16 SR2	400' (ft)	24fps: 11:06 25fps: 10:40	1982	Farm Studio ARRI Rental
	Bolex	H16	100' (ft)	24fps: 03:00 25fps: 02:53	1935	Not Nowhere
Super 16mm	Arri	Arriflex 416 Plus (HS)	400' (ft)	24fps: 11:06 25fps: 10:40	2008	OneStop Take 2
	Arri	Arriflex 16 SR3	400' (ft)	24fps: 11:06 25fps: 10:40	1992	Take 2
	Aaton	A-Minima	200' (ft)	24fps: 06:00 25fps: 05:46	1999	
	Aaton	XTR Prod	400' (ft)	24fps: 11:06 25fps: 10:40	1990s	SLVision
35mm 2-perf						
35mm 4-perf	Arri	Arriflex 435	400' (ft) **OR** 1000' (ft)	**400' (ft)** 24fps: 04:26 25fps: 04:16 **1000' (ft)** 24fps: 11:06 25fps: 10:40	1995	Take 2
	Arri	Arriflex 435	400' (ft) **OR** 1000' (ft)	**400' (ft)** 24fps: 04:26 25fps: 04:16 **1000' (ft)** 24fps: 11:06 25fps: 10:40	1995	Take 2
	Arri	Arricam LT (*Lite*)	400' (ft)	24fps: 04:26 25fps: 04:16	2000	OneStop Take 2
	Arri	Arricam ST (*Studio*)	400' (ft) **OR** 1000' (ft)	**400' (ft)** 24fps: 04:26 25fps: 04:16 **1000' (ft)** 24fps: 11:06 25fps: 10:40	2000	OneStop ARRI Rental
	Panavision	Panaflex Millennium XL2	400' (ft) **OR** 1000' (ft)	**400' (ft)** 24fps: 25fps: 04:16 **1000' (ft)** 24fps: 11:06 25fps: 10:40	2004	Panavision

65mm	Arri	Arriflex 765	500' (ft) **OR** 1000' (ft)	**500' (ft)** 24fps: 04:25 25fps: 04:15 **1000' (ft)** 24fps: 08:53 25fps: 08:32	1989	ARRI Rental
	Panavision	Panavision Panaflex System 65	400' (ft) **OR** 1000' (ft)	**400' (ft)** 24fps: 03:33 25fps: 03:24 **1000' (ft)** 24fps: 08:53 25fps: 08:32	1991	Panavision
	Panavision	Panavision 65 HR Camera	400' (ft) **OR** 1000' (ft)	**400' (ft)** 24fps: 03:33 25fps: 03:24 **1000' (ft)** 24fps: 08:53 25fps: 08:32	1991	Panavision
	IMAX	IMAX MSM 9802	1000' (ft)	24fps: 08:53 25fps: 08:32		IMAX

Lenses & Camera Equipment

Information to be written here.

Film Stock Suppliers & Hire Houses UK/USA and Europe

Once you've researched (*and even considered*) an appropriate choice of camera system for the production, you will need to check the stock in rental houses (*otherwise known as kit or hire houses/companies*) which are either local to your production's unit base (*where you will be based whilst shooting on-location*) or production company. Bear in mind that every hire house will have different inventories of stock, and you may need to acquire equipment from multiple hire houses: since you are shooting on film stock.

Although still relatively uncommon, there are an increasing number of places which hire out motion picture film cameras and also sell film stock, provide processing and scanning. Whilst it might seem convenient to hire kit, order stock and process/scan the film all in one facility - they will likely not be specialist (or

comparatively very new) in processing and scanning the film to the exceptionally high standards it requires. However, on the flip side, by working with a single company - you *may* find that, in dealing with the company solely, the production will save a lot of money as there often incentives to use multiple services which the company will promote.

In any case, it is *always* best to:

- **Order Stock from a KODAK <u>authorised</u> reseller**,
    - Often there are companies that do *just* that. You can often save money by bulk-buying (*ordering a large quantity*) stock for the production (*or even future productions if you are planning ahead*). As mentioned before, Film Stock should always be ordered in advance of when you're hiring the cameras.
- **Hire Film Cameras and Equipment from <u>dedicated</u> rental houses**,
    - with a reputable track record for client/customer relations, maintaining their equipment well, and who may be able to offer concessionary discounts or special packages to student groups, low budget and otherwise independent productions.
    - If you have arranged such services, you will also be able to shoot Camera/Stock Tests at the facility's studio or preparatory bays and even build/prepare the camera there before taking it away on your shoot. It is a very good idea to do this to ensure all the equipment you have ordered from the rental house is working properly to your needs.
- **Organise and Order the Processing & Scanning of Rushes at a <u>specialist</u> film post-production facility**.
    - The company (or companies, if working with more than one) will be able to advise and consult on the best ways in which to process your film. They can also help with workflow consultation and even provide negative stock recommendations best suited to different aesthetics and environments, as they are very experienced technicians.

Below is a Table of *UK-Based NStock Suppliers*, including information on the Stock Types they sell, and how much each roll/unit costs. Please note that the supplier's stock inventory and prices are likely to change. For the latest information, please consult the supplier's website and get in touch with them, especially if you need advice from them or to hear if they has sufficient stock for the production, if you're intending on shooting a lot (*i.e more than 1000ft*).

UK-Based Stock Suppliers						
	as of 08.01.21	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*	
Company	Region	Website	Email	Phone Number	Stock(s) Available	Cost
Analogue Wonderland	High Wycombe, S.E England	Website	Email	+44 1494 614514	Stand. 8mm, Super 8mm, Doub. 8mm, 16mm	Various *Reg 50ft x1* = £44.00 TriX 50ft x1 = £42.00 *Ektachr. x1* = £60.00 x1 = £40.00 Reg 100ft x1 £56.00 TriX 100ft x1 £56.40
Frame24	Chiddingfol	Website	Email	+44(0)7801	Super 8mm,	*Reg 50ft x1* =

	d, Surrey, S.E England			234882 **OR** +44(0)7774 608709	16mm, 35mm	£38.40 TriX 50ft x1 = £38.40 *Ektachr. x1* = £54.00 Reg 100ft x1 £45.60 DubX 100ft £48.00 TriX 100ft x1 £56.40 Ekta 100ft x1 £84.00 Reg 400ft x1 £118.80 DubX 400ft £138.00 Ekta 400ft x1 £345.60 Reg 400ft x1 £202.80 DubX 400ft £240.00
Gauge Film Ltd	Bilston, Wolverhampton, West Midlands, England	Website	Email	N/A	8mm Rever. 8mm Neg. 16mm Rever. 16mm Neg.	TriX 50ft x1 = £33.00 Ektachr. X1 = £50.00 Reg 50ft x1 = £33.00 TriX 100ft x1 £56.00 Ekta 100ft x1 £78.00 Reg 100ft x1 £45.00 DubX 100ft £48.00
On8Mil	Wood Green, North London, South East England	Website	Email	0330 122 7326	Stand. 8mm, Super 8mm, D-Sup 8mm, 16mm	Various *Reg 50ft x1* = £32.50 TriX 50ft x1 = £37.08 *Ektachr. x1* = £50.00 Various Reg 100ft x1 £40.42 TriX 100ft x1 £48.33 Ekta 100ft x1 £75.00
The Widescreen	Ely, Cambridges	Website	Email	01353 776199 **OR**	Stand. 8mm,	100 ASA x1= £28.00

Centre	hire, East England			07990 646466	Super 8mm, 16mm	*Reg 50ft x1* = £32.00 TriX 50ft x1 = £35.00 *Ektachr. x1* = £49.00 Reg 100ft £50.00 DubX 100ft £48.00 TriX 100ft x1 £56.00

Below is a Table of *UK-Based Rental Houses*, including their contact details and a basic overview of some of the Camera Systems available to hire out. Please note that the rental house's stock inventory and prices are likely to change. For the latest information, please consult the rental house's website and get in touch with them, especially if you need advice from them or to hear if they have the correct equipment you need as well as its availability. Most rental houses which have Film Cameras available are based in London only.

UK-Based Rental Houses					
	as of 08.01.21	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*
Company	Region	Website	Email	Phone Number	Camera System(s) Available
ARRI Rental (London)	Uxbridge, NW London, South East England	Website	Email	01895 457 100	FILM 16mm - Arriflex 416/Plus/HS 16mm: Arriflex 16 SR3/Adv/HS 35mm - Arricam Studio (ST) 35mm - Arricam Lite (LT) 35mm - Moviecam Compact 35mm - Moviecam SL 35mm - Arriflex 235 35mm - Arriflex 435 ES/Xtreme 65mm - Arriflex 765 DIGITAL Arri Alexa 65 Arri Alexa LF Arri Alexa Mini LF Arri Alexa Mini Arri Alexa SXT Arri Alexa Studio Arri Alexa XT B+W Arri Amira
Gear Room	North West London, South East England	Website	Email	+44 7976 768 673	FILM 16mm - Arriflex 416 DIGITAL Arri Alexa Mini LF Arri Alexa Mini
Feral Equipment	Park Royal, North West London, South East England	Website	Email	020 7625 9829	FILM DIGITAL
Panavision	Greenford, Middlesex,	Website	Email	+44 (0)20 8839 7333	FILM 35mm - Golden Panaflex GII 35mm - Panaflex Millennium

	South East England				35mm - Panaflex Lightweight II 35mm - Panavision Platinum 35mm - Panaflex Millennium XL2 65mm - Panavision Large Format System 65 DIGITAL Panavision Millennium DXL2 Panavision DXL-M Phantom Flex 4K
Procam (*London*)	Acton, West London, South East England	Website	Email	+44 (0)20 7622 9888	FILM DIGITAL
Procam (*Manchester*)	Manchester, North West England	Website	Email	+44 (0)161 604 0701	FILM DIGITAL
Procam (*Glasgow*)	Glasgow, Scotland	Website	Email	+44 (0)141 429 4200	FILM DIGITAL
Take 2	Park Royal, North West London, South East England	Website	Email	+44 (0)20 8992 2224	FILM 16mm - Arriflex 416 16mm - Arriflex 16SR3 Advan. 16mm - Arriflex 16SR3 Adv. HS 35mm - Arricam Studio (ST) 35mm - Arricam Lite (LT) 35mm - Arriflex 435 35mm - Arriflex 235 35mm - Arriflex 435 Xtreme DIGITAL

Below is a Table of *UK-Based Camera Repair Companies*. These should only be used for cameras which are not rented from a company, including any of the above, but are in fact self-owned. Approach the companies with caution, as they may not be able to repair complex camera systems or specific brands/models, however they may be able to put in touch with those who can offer services. Often, in the event of a required repair, it is always advisable to get in contact with the camera's brand (*i.e ARRI, Panavision, Bolex*) who know how the cameras work and can give you a quote or contact details to one of their authorised repair houses.

UK-Based Camera Repair Companies (*for non-rental / self-owned camera systems*)						
	as of 08.01.21	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*
Company	Region	Website	Email	Phone Number	Specialisms	Cost
Aperture UK	Soho, Central London, S.E England	Website	Email	020 7436 9844	Camera Part Exchange/ Selling and Repairs	POA
Sendean Cameras	Clerkenwell, East Central London, S.E England	Website	Email	020 7242 7733	Camera Repairs	POA

Film on Film

Quick Guide

Below is a Table of *UK-Based Film Labs*. These are the recommended companies which can handle varying quantities of film for developing, scanning and other post-processing. Any other companies not listed here should be avoided.

UK-Based Film Labs (*for Developing, Scanning & Post-Processing*)						
	as of 08.01.21	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*
Company	Region	Website	Email	Phone Number	Stock(s) Accepted	Cost
Cinelab	Slough, South East England	Website	Email	+44(0)1753 501 500	Super 8mm, 16mm, 35mm, 65mm	POA
Kodak Film Lab London	Iver, South East England	Website	Email	01753 656610	Super 8mm, 16mm, 35mm, 65mm	POA
On8Mil	Wood Green, North London, South East England	Website	Email	0330 122 7326	Stand. 8mm, Super 8mm, D-Sup 8mm, 16mm	POA

Below is a Table of *UK-Based Film Printing Companies*. The advent and industry-wide adoption of digital cinematography, editing and projection in the early 2000s caused the process of making positive prints of films for distribution in cinemas to rapidly deplete. More recently, the process of Film Printing has begun to make a small but significant enough resurgence (*largely due to the interests of international productions and film enthusiasts in pursuing the process*) to warrant the re-establishment of film printing. A process which began at the very beginning of cinema, over a hundred years ago: film printing in the modern era is created directly from a data source (*i.e DCP, DPX or QuickTime File*) and laser-printed onto 35mm film reels.

UK-Based Film Printing Companies (*for digital-to-film or reel-to-reel printing*)						
	as of 08.01.21	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*	*as of 08.01.21*
Company	Region	Website	Email	Phone Number	Stock(s) Available	Cost
CPC London	Aylesford, Kent, South East England	Website	Email		35mm Printing	POA

If you are intending to shoot and/or process & scan film internationally, *KODAK* has an official webpage with information pertaining to Film Laboratories it recommends that are located in various countries and regions. For more information about what services a lab provides and to get in touch; please visit their website which is included in the table below.

KODAK Film Lab Directory														
		Accepted Gauges					**Restoration**	**Processing**		**Scanning**				**Film Printing**	
Country	Film Lab	S U	S T	S U	35mm	65mm	Std8 Sup8	C O	B &	H D	2 K	4 K	5 K	16 M	3 5

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		PER 8MM	AND 16MM	PER 16MM			Std16 Sup16 35mm 65mm	LOUR	W					M	MM
Americas															
Argentina	Cinecolor														
Canada	Films8mm.com														
	Film Rescue Int.						Multipl								
	MELS-Studios														
	Niagara Custom														
	TMTV Digital														
Mexico	Estudios Churubusco Azteca														
	LABODIGITAL														
USA	BB Optics						Multipl								
	Cinelab Inc.														
	Colorlab Corp.														
	Dwayne's Photo														
	Film Rescue Int.						Multipl								
	Fotokem														
	Gotham Photochemical														
	Kodak Film Lab Atlanta Delivery														
	Kodak Film Lab Atlanta Scannin.														
	Pro8mm														
	Kodak Film Lab New York														
	Spectra Film and Video														
	Yale Film & Video														
Europe															
Belgium	Cinematek														
	DeJonghe Film Postproduction														
	Studio L'Equipe														

Film on Film

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Czech R.	Czech Television														
	Filmove Laboratore Zlin, a.s														
France	C-ae Cine -Super8														
	Digimage LE LAB / Digimage Classics														
	SILVERWAY Paris														
Germany	Andec Filmtechnik GmbH														
	SILBERSALZ FILM Lab														
Hungary	Artbaziz							Hnd	Hnd						
	Focus-Fox Studio														
	Hungarian Filmlab														
Italy	Augustus Color														
	FOTOCINEMA srl														
	L'Immagine Ritrovata														
	Movie and Sound Firenze srl														
Netherlds	Haghefilm Digitaal														
	Super8 Reversal Lab														
Poland	WFDiF - DOC Film Studio														
Romania	Cinelabs SRL														
Russia	Cinema-Pro														
	Mosfilm														
	Stake Archive Gosfilmofond														
Spain	RetroLab Cinema							Hnd	Hnd						
Sweden	Focus Film														
Switzerld	Cinegrell														

	Postproduction GmbH														
Turkey	Sinefekt Post Production Services														
Ukraine	Service-film														
UK	Cinelab London														
	Cinema Printing Company (CPC)							Hnd	Hnd						
	Gauge Film Ltd							Hnd	Hnd						
	Kodak Film Lab London														
Middle East & Africa															
Egypt	Studio MASR Lab														
Asia Pacific															
Australia	Nano Lab														
	National Film and Sound Archive						8mm Sup8 9.5mm								
	Neglab														
China	Beijing Film Lab														
	China Film Archive Xi'an Film Lab														
	DDREDfilmlab														
India	Film Lab														
Japan	IMAGICA Lab.														
	Retro Enterprises Co. Ltd														
	Tokyo Laboratory Ltd														
Kazakstn	Kazakhfilm studio														
New Zld	Film Preservation Laboratory, Archives NZ														
Taiwan	Modern Cinema Laboratory														
Thailand	G2D Co. Ltd														
Vietnam	Vietnam														

Prep After Shooting:
Canning, Delivering, Processing & Scanning Rushes at The Lab

Preparing to Deliver Rushes (Cans of '*Exposed*' Film) from The Set to The Lab

Now you're on location or in a studio shooting the production, you will need to consider how the exposed (*filmed*) stock will come off the set, be prepared/packaged, and the means of transport to and from the laboratory who will handle processing and/or scanning.

But, first of all - it is important to properly log *and* can the films *as* you're shooting, which (*in addition to the 2nd AC's other duties*) are their primary concerns. The camera dep artment's 2nd Assistant Camera (*known colloquially as the Clapper/Loader*) will be sufficiently trained and familiar with the process of using a *Negative Report Sheet* to log the type and amount of footage shot - including whether it is a good take or not and any technical/processing comments which the lab needs to know about. The Lab needs to know how the film should be processed, which is indicated on the Neg. Report Sheets. The Neg. Report Sheets should be compiled neatly, stapled together and included in the film can. The Neg. Report Sheet inside a can must correspond to the can's contents.. Every film roll needs to have its own can to avoid confusion when the lab comes to handle and ingest the rushes for processing and scanning.

Secondly - sending the exposed, canned film rolls to the film lab *needs* to take place once you have wrapped each and every day. On major motion pictures, a professional courier (*possibly one dispatched by the film processing lab*) or otherwise, will have been organised to be ready just by the Unit Base to transport the rushes to the Film Lab at the correct time. If you are working on an independent production, and are shooting a minimal amount of film (*i.e less than 1000ft*) or shooting on a small number of days - or even just one day: you should *only* deliver the rushes once you have finally wrapped.

Recommended Rushes Drop-Off & Collection Hours

If you are shooting during the day and you are able to wrap, prep/can the rushes, and have them delivered to the Film Lab in time for around the end of the working day (*which is normally considered to be between **4.30 - 5.30pm**, by most film lab standards*), then they will set the film to be processed overnight. The film will then be ready for collection, usually from around **8.30am** in the morning, the next day. Although, it is best to come at around **10.30 or 11am** if possible - especially if you have ordered the Lab to facilitate scanning and supplying of data files to a hard drive as well.

If you are doing an overnight shoot, and you are able to wrap, prep/can the rushes, and have them delivered to the Film Lab prior to them opening for the day's business - they will usually be ready at around the <u>end</u> of the working day. Arrange for the processed or processed/scanned rushes to be collected just before then. In both instances, day or night-time shooting (*particularly for independent productions*), the following applies:

Some common knowledge to bear in mind - if the Film Lab is particularly busy handling a high volume of orders at any one time (*or working around-the-clock providing services on a major motion picture film*), and the production you are shooting is a low-budget or otherwise independent film - then the film will most likely <u>*not*</u> be processed overnight or in time for a prospective *Rushes Viewing*, the following day. Instead, the film will be processed at a convenient time for the company - as bigger budget productions with demanding deadlines tend to bump lesser time-consuming/demanding productions down the pipeline priority list.

Artist/Student Film Productions, including those shot by film schools such as The *NFTS* (*National Film and Television School*) or *University of Westminster*, can often take at least **2-3 days** for processing and scanning to

be completed and ready for collection. Where possible (*and to keep things simplified*) it is best to deliver and hand-in the rushes themselves after the production has wrapped - if you have sufficient time on your hands or before post-production starts.

Choosing the Correct Film Lab: Identifying Film Needs & Financial/Logistical Possibilities

Choosing the correct specialist film lab (*from the list above*) is critical to how well and particular the film needs to be handled and processed. The list of laboratories (and their details) above have a long-standing history and proven track record of providing professional film services to productions ranging from Major motion pictures and high-end television drama to independent and film school productions. These companies are extremely specialist in their knowledge, and also have the sufficient operational capacity and machinery to process the film correctly. These companies are also used to working at fast speeds in order to meet production deadlines.

When selecting a film lab to process/scan your film, it is worth considering the following and preparing the relevant information for when making an enquiry to them:

- **What do you need?**
  - ***Processing*, *Scanning* or *Both*?** You will require both eventually, and it makes most sense logistically and financially to use both. However, it is worth noting that some major motion picture studios and productions will select a different/specific film lab or facility for each phase of the process. For example, processing the film at *Cinelab London* and scanning the film at *Technicolor*.
  - **How do you want the film scanned?**
    - Do you want the film scanned at '***Best Light***' (*deeper shadows, more saturation, with scene-by-scene exposure correction*) or at '***One Light***' (*raw scan, colour corrected to 'real world' colours but exposure left unchanged*). In most cases, you will want a '*One Light*' scan. However, some directors and producers want for their Rushes Viewings to see the rushes close to how they might end up looking in the cinema, so for that reason would have a separate scan done at '*Best Light*' whilst likely using the data from the '*One Light*' scan in the AVID. This ends up costing a lot more money.
    - **How much physical area of the film do you want to be scanned?** You can arrange for the film to be done as a '***Full-perf Overscan***' (*the entire width and height of the film, including all perforations and a slither of the frame before and after, is scanned*). There is often an option for a '***Standard Overscan***' (*the entire width and height of the film, not including perforations, is scanned*). There is also the option for the film to be scanned as '***Cropped***'. In virtually all cases, unless specific instructions have been requested by the studio or director (and if there's the budget to carry those out), you will want to have a '*Full-perf Overscan*'. You can always re-frame the image when editing in AVID, and even perform re-sizing adjustments at this stage.
  - **What frame rate did you shoot at?**
    - **Films shot on *8mm* and *Super8* are generally shot at either 16fps, 18fps or 24fps** as these are the only settings on most cameras produced of this type. If you have not yet selected a frame rate to shoot on, you should shoot at 24fps, as this is a standard that can be worked with during editing and can be projected in a cinema.
    - **Films shot on 16mm, 35mm and 70mm are generally shot at 24fps.** This is usually because it is the dominant standard for film editing/projection and may also likely be a limitation of the camera system used. There are some film cameras that can shoot at higher frame rates, though often digital cinema cameras are used for those sequences. It is increasingly common for films to be shot (*and have the capability of shooting*) at 25fps, and more editing and projection systems are accommodating this as time comes on.
- **How much does it cost?**

- **The allocated budget for this is often minimal** on medium or low-budget independent productions, if it is considered at all.
- **Processing & Scanning, and any specialist corrections required, are extremely expensive.** The film chemicals and chemical processes are sophisticated and expensive to produce, even more so now than before as comparatively very few films are shot *on film* compared to digital. The labour of the technicians involved as well as maintaining the upkeep of specialist machines also contribute to the high costs. Besides key technological changes in the industry, these are some of the reasons why shooting on film (and all the subsequent processes that come with it) are often avoided altogether.
- The cheapest option is by selecting *Processing Only*, which is pointless - unless your intention is either to have the film Scanned at another film lab/facility, or, to archive and preserve the film for Scanning at a later date.
- ***HD Scanning*** is the cheapest option, and though higher resolution scanning is now more affordable to do, it is still the most common scanning resolution. Scans are at 1080pHD, and are scanned at the same frame rate as you originally shot in.
- ***2K Scanning*** is more expensive but provides higher quality than HD. Although the file size will be larger than HD, It is also worth considering if the finished film will eventually be projected in a cinema - as 2K is a recognised digital cinema standard.
- ***4K Scanning*** is the current standard of scanning resolution for major motion picture films and medium-budget independent productions internationally. Films are increasingly being edited, published, distributed and projected in 4K. If the production can afford a 4K scan, and you are looking for an impressively sharp image to work with digitally, it is worth considering this option.
- *In certain facilities*, though often not publicly advertised, there are other scanning options available such as ***6K*** and ***8K***. These services are primarily reserved for 70mm and IMAX 70mm shot films and in the restoration efforts of archival films with historical or scientific importance.

- **What region/country is the production shooting or based in?**
  - If what you need for processing and scanning the film is indeed satisfied by the services of a film lab, then it makes the most sense to choose a lab which is in relative close proximity (*where possible*) to where your unit base is. This is so that the transport time of the film rushes between the set and lab/facility is as quick as possible.
  - **If shooting in/near *London* or a *Film Hub*, it would be illogical to book a film lab which is a few hundred miles away from the shooting location.** The exception would be if rushes delivery is physically impossible or you are shooting in a remote location - far away from *London* or any of the major film production/post-production city hubs in the UK.
  - If where you are shooting (*or the specialist services required*) necessitates that you book the services of a film lab far away, then this will of course come at the detriment of *Rushes Viewing Sessions* and make it virtually impossible for rushes to be viewed in a timely manner alongside principal photography happening concurrently.
  - Additionally, although many major motion pictures shoot in different countries than the production company or studio is based in, the country where the film's post-production services will be undertaken is (*by and large*) the primary indicator of where the film will be handled, processed and scanned at.
  - The post-production of most productions shot in the UK for Film & Television, tends to gravitate around Soho in Central London - although, the advent of thriving film hubs in regions such as *Manchester, Birmingham, Bristol, Leeds* and *Glasgow*, are changing things.
  - Most major American studio productions, and major studio productions of other countries usually have their film post-produced (including film processing and scanning) in one of the commonly-used international film hubs including *Los Angeles and New York* (America), *Berlin, Paris or Venice* (Europe), *London* (UK), for instance. Independent productions will tend to post-produce, process and scan and film in their own regions and countries.

Regarding choosing a film lab, on the flip side - It is worth noting that there are *many* hundreds of independently-run, high-street and supermarket outlets which claim to advertise '*professional movie film*' or '*analog transfer and conversion services*'. <u>These should be avoided at all costs.</u> Initially, the likelihood is that these companies *do not* do the services needed to process film correctly. However, if they do *seem* to do

them *or* indeed persist that they do, the company will most likely perform a highly generic and unsatisfactory development and scan process of the footage - which, when finished, will barely be usable in editing or projection. This will also most likely damage the film too.

Rushes Viewing Sessions: Purpose & Aims

It is almost *always* the case that major motion pictures which shoot on film will send/ship the Dailies (*american term*) / Rushes (*british term*) to the lab whilst shooting is ongoing, so that *Rushes Viewing Sessions* can occur alongside principal photography. This is so that both the director, producer(s) and financiers such as studio executives can see that the film is *actually* being made, and everything that was planned to be shot on each respective day is indeed being shot - on time, and *most* importantly, on budget.

Rushes Viewings are typically held in the evenings in a screening room or a laptop if 'on-location' (*or if shooting night shoots, during the day - provided those in attendance are not tired, pre-occupied or otherwise unable to attend*). They are attended by the individuals mentioned, but may also include other key heads of department such as the *Director of Photography, Editor* and *Continuity Supervisor* (*Script Supervisor*). These are held nightly and, *ideally*, after wrap (*final shooting day*). Due to the nature of shooting film compared with digital cinematography, organising Rushes Viewing sessions *during* shooting are critical to identify and discuss any aesthetic or technical issues that emerge in the footage itself but were not obvious at the time of shooting to be modified or corrected. Due to the production's time and budgetary constraints, you will be unlikely to revisit or re-shoot any of the scenes - especially on an independent low-budget production.

Rushes Viewing Sessions: A Bit More

Rushes Viewings (or *viewing the dailies*, or, *looking over the rushes* - as the process is sometimes called) are an opportunity not just to identify critical issues or points in the scene whereby the coverage (*camera angles*) might not likely to be sufficient enough to tell the story, convey an action, character revelation or other important detail within a scene - but, is an opportunity to have fruitful and creative discussions about how the film is shaping.

These are just some of the areas to contemplate *during* and *after* Rushes Viewings:

- Are there any technical issues with the film footage / recorded material?
    - Look out for: visible hairs, perforation tears, blemishes, light leaks, soft focus, poor or mistimed focus pulling, poor or mistimed camera movements etc…
    - Listen out for: if the sound is too quiet/poor, static or damaged cables/equipment, unwanted background noise, the actor's voice performance,
- For a long or dramatic scene
    - Is there enough coverage (*camera angles*) - i.e are the actors in conversation all filmed, what are the shot sizes like and how could they work or be used in sequence? Are there shots of: each character talking, each character reacting to the one talking or what is going on and, important scene details like an object being looked at or moved for instance.

Films are almost always logistically shot in non-chronological (story) order, for various reasons, so that time can be saved whilst filming. This is typically due to a few (*if not a lot*) of the following reasons:

- An actor may only be available for a limited amount of time, which would necessitate filming all of their scenes together so they can sign-off and move onto their next production. This is often the most important reason.
- A location, place or set may feature in multiple scenes, in which case it makes most sense to film all scenes (*or occurrences*) involving that location sequentially. It would be significantly more expensive and arduous to repeatedly come back to a set or location and re-build the set and set-up equipment.
- Conversely; a *legitimate* reason for shooting in script order would be: When an actor must undergo a physical transformation, or in cases where there are child actors involved, shooting in script order enhances an actor's look and performance.

With production ongoing, concurrent rushes viewings taking place and editing beginning all at the same time; it is admittedly a difficult but nonetheless essential skill for directors (*especially*) and involved crew in this process to be able to form (*and be open to*) an ever-evolving/improved idea of what the film will end up looking *and* sounding like. In today's contemporary landscape; where turnaround times for shooting, deliveries and ingesting of rushes, and creating draft edits - it is vital that everyone involved stays on top of the days demands and of the days which follow.
