

Technical and Quality Requirements
for
Film Australia Limited (FAL) Program Delivery

Description Intended Audience:	Production teams, including technicians and producers, and independent production companies.
Use:	Information about delivery of programs to FAL
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Table of contents

1. TECHNICAL & QUALITY REQUIREMENTS FOR FAL PROGRAM DELIVERY.....	3
1.0 Scope of document.....	3
1.1 Introduction	3
1.2 Technical Responsibilities for Programs.....	3
1.3 Relaxation of Standards - Exemptions.....	4
2. TECHNICAL REQUIREMENTS.....	5
2.1 General Signal Requirements.....	5
2.2 Widescreen Production - Safe Areas.....	5
2.4 Requirements for High Definition (HD) Delivery.....	7
2.5 Audio Standards for Standard Definition (SD) and non-5.1 High Definition delivery.....	9
2.6 Surround 5.1 Audio Standards for High Definition delivery.....	9
3. QUALITY REQUIREMENTS	10
3.1 Quality Grading	10
3.2 General Quality Requirements	10
3.3 Picture quality requirements for SD and HD programs.....	10
3.4 Special Picture Quality Requirements for HD Delivery.....	11
3.5 Use of SD material in HD programs.....	11
3.6 Use of Electronic Video Processing	12
3.7 Titles and Credits.....	13
3.8 Audio Quality Requirements and Sync	13
4. DELIVERY REQUIREMENTS FOR MASTER VIDEOTAPES	15
4.1 Technical Acceptance Procedures.....	15
4.2 SD Standard Definition Videotape Format.....	15
4.3 HD High Definition Videotape Format.....	15
4.4 Tapeless delivery.....	15
4.5 Recording Reports.....	15
4.6 Line-up Test Signals and Leader	16
4.7 Recorded signal levels:	16
4.8 Textless (Clean) Backgrounds	17
4.9 Timecode and control track.....	17
4.10 Audio Track Allocation on Program Master	17
4.11 "Surround 5.1" Audio Delivery	17
4.12 Audio Premix Elements.....	18
5. STANDARD CONTENT FOR FAL PROGRAMS	18
6. GLOSSARY AND DEFINITIONS	19
7. USEFUL CONTACTS	19
8. Appendix 1: CHOICE OF ACQUISITION FRAMERATE.....	20
9. Appendix 2: EXAMPLE - APPLICATION FOR EXEMPTION FROM TECHNICAL STANDARDS	21
10. Appendix 3: APPLICATION FORM - EXEMPTION FROM TECHNICAL STANDARDS.....	22

1. TECHNICAL & QUALITY REQUIREMENTS FOR FAL PROGRAM DELIVERY

1.0 Scope of document

This document covers the technical and quality requirements for programs commissioned in **Standard Definition** (for delivery on Digital Betacam) and/or **High Definition** (for delivery on HD CAM), which are to be distributed by FAL.

1.1 Introduction

FAL aims to maintain the highest technical and qualitative standards, optimizing program acceptance for both domestic and worldwide markets.

Technical Requirements

This document sets out the minimum acceptable standards for programs delivered to FAL, in such a way that the program may reliably be broadcast by FAL customers now and into the future.

The standards are based on internationally accepted standards and are well understood and complied with by broadcasters around the world.

Quality Requirements

Quality requirements deal with broadly subjective quality issues with the pictures and sound. Careless shooting, inappropriate production or postproduction methods and faulty or substandard equipment can cause avoidable impairment to sound or vision. The ITU / CCIR 5 point grading scale will be used to assess programs for quality.

There are some aspects that fit into both categories for example the requirements on avoiding photosensitive epilepsy in the audience.

Due to the rapid rate of technical development, use of specific equipment is constantly under review. This document will be subject to periodic re-issue to reflect this reality, but if using technology *not* covered by this document you will need to check with FAL technical staff to ensure that it will meet these specifications.

1.2 Technical Responsibilities for Programs

General Responsibilities

The Executive Producer (EXECUTIVE PRODUCER) is required to ensure that program technical quality is maintained to an appropriate satisfactory standard for FAL's customers now and into the future.

It is never the intention to frustrate the producers' ambition to make their program in the way of their choosing. The purpose of this document, and associated material, is to set out the technical requirements to ensure that material is of a satisfactory standard and is of a format that is acceptable.

Technical Liaison & delivery

Please ensure delivery of the program master to the relevant FAL Business Affairs Manager.

For all queries in relation to technical standards call the FAL Technical Staff on +612 9413 8684.

1.3 Relaxation of Standards - Exemptions

All programs are expected to meet our required technical standards. The recognised exemption categories are constrained and may not be invoked for the general convenience of program makers.

Where programs fail to meet full broadcast technical specifications and fall outside these categories it will be necessary to apply for special exemption. The production company should discuss these prior to the start of production with their FAL executive producer. This will allow discussions to proceed at an early stage and, although in no way guaranteed, it will reduce the likelihood of subsequent difficulties.

Any proposal to deliver program material that does not conform to the standards in these guidelines should be agreed beforehand, as far as is practically possible, with FAL.

The Executive Producer (EP) must sign off any exemptions. **(see Appendix 2: Application for Exemption from Technical Requirements)**

There are five recognised categories for technical exemption:

- **Artistic interest** Innovative or experimental productions which are made, of necessity, by those who do not have access to equipment or facilities meeting broadcast quality standards.
- **Historic interest** News or programs of a documentary nature which show historic events taking place or whose subject matter requires the use of archive material.
- **Actuality material** News, features or documentaries of an actuality nature where better quality has not been possible because of limitations placed on the format or physical size of equipment used. Such limitations are those incurred as a result of shooting in difficult areas such as war zones, isolated locations, confined spaces or other difficult environments.
- **Early television and cinema** Excerpts from historical archives where low technical quality was due to the then-current performance of equipment used in its creation, or where quality is now lower than at the time of original showing because of film or video ageing.
- **Home videos** Programs which employ excerpts using domestic video equipment in which the context requires that these are used. NOTE: This is not permissible in HD masters.

NOTE: Programs to be delivered on HD masters have much more stringent quality requirements, and exemptions need to be sought at a very early stage of pre-production if these are to be accepted.

2. TECHNICAL REQUIREMENTS

2.1 General Signal Requirements

Technical requirements must be met so that program material is in the required format, which can be used reliably without any user intervention and can be passed through systems without noticeable impairment to the viewer.

Although the majority of programming is now produced and delivered digitally, the signals must still be compliant with analogue standards. For example excessive (illegal) levels are likely to cause severe picture disturbances when copied to analogue tape formats such as Betacam SP or sound buzz on analogue transmission.

2.2 Widescreen Production - Safe Areas

Programs should use the full height and full width of the 16:9 frame.

Programs should always conform to the following configuration: 16:9 widescreen shoot to protect 14:9. This means that the program can be viewed in 14:9 with no loss of essential information.

It is not acceptable for changes from 16:9 display to 4:3 display within a program.

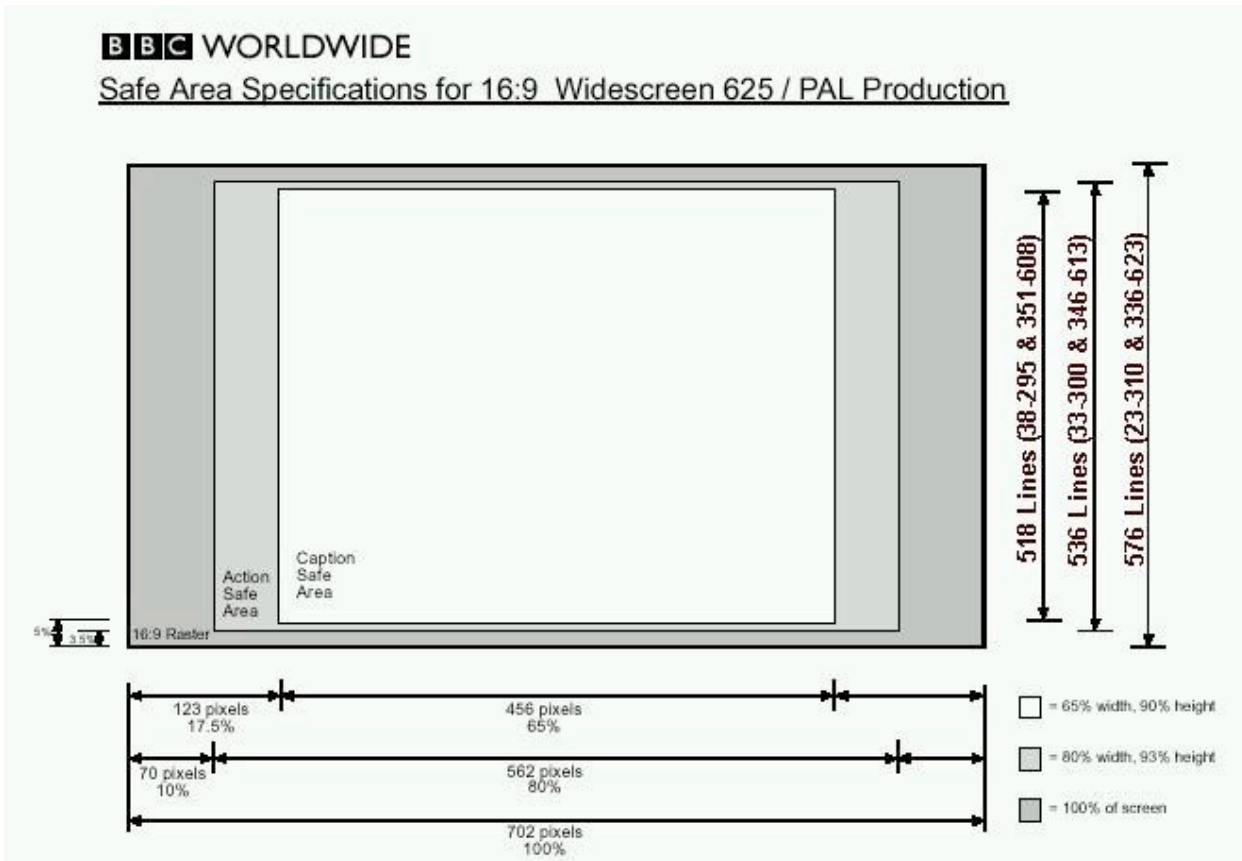
Although High Definition is a fully widescreen standard with 16:9 action and caption safe areas, most HD programs will be down-converted for distribution in areas that use standard definition protection standards. To allow compatibility, unless otherwise agreed with the EP, High Definition programs should conform to the same safe areas criteria as Standard Definition.

Titles and captions should ideally be “4 x 3 centre-cut-out safe”. This means that if the program is broadcast “centre cut”, for example on in-flight video, or by certain analogue broadcasters, graphics and titles will still be fully legible. This measure allows the program to be meet the varying needs of broadcasters around the world.

These safe areas are as defined and used within the standards documents ITU R BT.1379-1 and EBU R95-2000.

FAL 16:9 Safe areas	
Action Safe	Title / Caption Safe (centre cut out)
80% of Active Width	65% of Active Width
93% of Height	90% of Height

The following diagram from the BBC Worldwide Specification shows the correct Safe Areas:



Notes:

- The Screen Aspect Ratio and Safe Areas shown above apply specifically to the PAL 625 SD Standard.
- Pixel Dimensions shown above relate to a picture width of 702 pixels (wide blanking) and should be adjusted proportionally if using a 720 pixel width (narrow blanking). The percentages are accurate for both picture widths.
- The percentages shown (not the pixel dimensions) apply equally to HD Standards, and should be maintained.

2.3 Requirements for Standard Definition (SD) Delivery

Video System Standards

All SD material shall be of the 625/50 interlaced standard.

Active picture width is 52us / 702 pixels. All aspect ratio calculations are based on this. Any processes based on 720 pixel width may introduce unwanted geometry or safe area errors.

Signals will be assessed according to the recommendation CCIR Rec. 601 or ITU-R BT601-5 Part A

Program signal parameters

Must correspond to the reference line-up levels. These include peak sound, maximum luminance & colour difference (Y Cr Cb) component levels, and black levels. Care must be taken to avoid illegal colours (Y Cr Cb component signals exceeding the gamut limit) which may be generated by caption and graphics systems. See section 4.7.

Video Levels and Gamut (illegal signals):

Video levels including any line-up shall be received within the specified limits so that the program material can be used without adjustment.

Video levels are based on the PAL System which specifies 0 to 100% RGB Limits. We require that signals meet the easier EBU Recommendation R103-2000:

- Luminance limits -1% and 103%
- Chrominance 105% max - RGB values to not exceed limits -5% to +105%
- Overshoots can be ignored by the use of a low pass IRE filter. Single lines with larger errors caused by vertical processing such as aperture correction and aspect ratio conversion are permitted if they do not exceed the -1% Luminance limit.

Video Line-Up

Line-up signals serve to identify individual signal channels and to provide reference levels to confirm that the program transmitted is likely to be within the signal level limits and will be as the producer intended.

Program video and audio signal levels must be accurately related to their associated line-up signals but not exceed the limits above. The maximum deviation of program levels from that indicated by the line-up signals shall be:

- Video Luminance 3%
- Video Chrominance 5%
- Line blanking level shall be used as a black reference for the program.

See section 4.6 for usage of Line-up signals.

2.4 Requirements for High Definition (HD) Delivery

Video System Standards

HD program masters and submasters must be delivered in the 1080/50i (interlaced) format only.

Material may be acquired in either the 1080/50i (interlaced) or 1080/25p (progressive) or 720/25p (progressive) standard.

HDV format is **not** an approved HD standard.

Program signal parameters

Video signals must correspond to the reference line-up levels. These include peak sound, maximum luminance & colour difference (Y Cr Cb) component levels, and black levels. Care must be taken to avoid illegal colours (Y Cr Cb component signals exceeding the gamut limit) which may be generated by caption and graphics systems. See section 4.7

Video Levels and Gamut (illegal signals):

Video levels including any line-up signal must be within the specified limits so that the program material can be used without adjustment.

Video levels must be compatible with the PAL System which specifies 0 to 100% RGB Limits. We require that signals meet the easier EBU Recommendation R103-2000:

- Luminance limits -1% and 103%
- Chrominance 105% max - RGB values to not exceed limits -5% to +105%
- Overshoots can be ignored by the use of a low pass IRE filter. Single lines with larger errors caused by vertical processing such as aperture correction and aspect ratio conversion are permitted if they do not exceed the -1% Luminance limit.

Vertical blanking

V Blanking for interlaced video should fall within SMPTE 274M/295M specifications, as stated in section 14 "Analogue Sync" and section 15 "Analogue Interface" and in ITU-R specification BT.709-4. The vertical blanking interval should equal lines 1-20 and lines 561-563 of the first field and lines 564-583 and lines 1124-1125 in the second field.

Horizontal blanking

H blanking should fall within SMPTE 274M/295M specifications, as stated in section 14 "Analogue Synch" and section 15 "Analogue Interface" and ITU-R specification BT.709-4. Horizontal blanking should be between 280 clock periods and a maximum of 292 clock periods, creating a blanking width of between 3.775 microseconds and 3.935 microseconds when a clock period is equal to 13.48 nanoseconds.

Video white levels

White level should not exceed 700mV for component signals, and program black levels should not extend below 0V (DC). Neither the program luminance whites nor blacks should be clipped excessively. For colour difference signals R-Y and B-Y, levels shall not exceed 700 mV or fall below 0 mV when set at a 350 mV offset.

Video Line-Up

Line-up signals serve to identify individual signal channels and to provide reference levels to confirm that the program transmitted is likely to be within the signal level limits and will be as the producer intended.

Program video and audio signal levels must be accurately related to their associated line-up signals but not exceed the limits above. The maximum deviation of program levels from that indicated by the line-up signals shall be:

- Video Luminance 3%
- Video Chrominance 5%
- Line blanking level shall be used as a black reference for the program.

2.5 Audio Standards for Standard Definition (SD) and non-5.1 High Definition delivery

Programs shall be delivered in Mono or Stereo Format as required. The use of pre-emphasis and/or noise-reduction schemes during acquisition and post production is acceptable. However, the program for final delivery should have no pre-emphasis or noise reduction scheme applied unless specifically required.

- Left audio shall be present on the A leg or Channel 1.
- Right audio shall be present on the B leg or Channel 2.
- Mono shall be in Dual Mono format with identical and coherent audio on both Left and Right channels.
- This is so that it may be used amongst stereo programs.

Finished program material intended for transmission with stereo sound, whether recorded on videotape or for live transmission, must carry sound in A/B (Left/Right) form. M/S (Mid/Side) is not acceptable for delivery.

Audio Levels

Digital Audio Reference level is defined as 18dB below the maximum coding value (-18dBFS) as per EBU recommended practice R68.

Digital Audio Reference level may also be accepted at 20dB below the maximum coding value (-20dBFS)

Mono derived from Stereo shall be to the M6 practice where the Mono signal is derived according to:
"Mono = (L+R) - 6dB"

Audio Line-Up

Line-up Tones serve to identify individual signal channels and to provide Reference Levels to indicate that without adjustment the program transmitted will be within the signal level limits specified above and will thus be broadcast as the producer intended.

- All tones must have been sourced to a tolerance of +/- 0.1dB.
- Mono Line-up Tone shall be at a frequency of 1 kHz +/- 100Hz and represent 8dB less than the maximum allowable peak.
- For Stereo sources, Stereo Line-up Tone shall be provided at a frequency of 1kHz +/- 100Hz and shall indicate the Left and Right program legs: namely, EBU / ITC Stereo Tone at -8dB (PPM 4 / Zero Level) with only the left leg identified by breaks.
- All tones must be sinusoidal, free of distortion and shall be phase coherent between channels.
- Optionally, Step Tone sequences may be provided but if so then all tones must have been sourced at the same level and be phase coherent on Stereo feeds / tracks.

Stereo Balance and Phase

- The two stereo legs, when sending identical program (Mono), shall match within 0.5dB and be phase coherent to less than 15 degrees at 10kHz (-20 dB for an "S" reading meter / 4us delay). Note: one sample of 48 kHz is 75 degrees at 10 kHz.

2.6 Surround 5.1 Audio Standards for High Definition delivery

Programs delivered with a 5.1 sound track require a stereo (Lt Rt) mix down on the delivery videotape. Preferred track layout for 5.1 deliveries is given in Section 4.11

3. QUALITY REQUIREMENTS

3.1 Quality Grading

Overall quality of sound and vision will be separately assessed by a trained operator and any impairments noted.

At the end of the technical review the program will be judged against the **ITU-R five-point impairments grading scale** as shown below:

Grade 5	Imperceptible impairment
Grade 4	Perceptible but not annoying impairment
Grade 3	Slightly annoying impairment
Grade 2	Annoying impairment
Grade 1	Very annoying impairment

New commissioned programs should meet a minimum of grade 4 for sound and vision quality. The minimum acceptable quality for any program is grade 3 unless there are valid reasons for technical exemption, in which case details should be clearly stated on the recording report.

Programs with one or more quality impairments graded 2 or less are not acceptable and will be returned to the producer for resubmission after correction.

3.2 General Quality Requirements

We wish to encourage the use of innovative program making techniques. Nothing in this document should prohibit the use of any production technique provided that a suitable quality product results. It is inherently difficult to define precisely what a suitable quality product is, and therefore there may be some subjective descriptions leading to imprecise advice. This is an unavoidable consequence of the rapid technical developments at this time. A competent resource provider should be able to give advice on achieving good quality results

In certain circumstances, for example shooting actuality material or where a high level of mobility is required, the use of a DV or HDV "palmcorder" type camera may be considered acceptable for acquisition, but specific agreement from the Executive Producer must be obtained, in writing before using this. Where use of this format is agreed we require particular attention to be given to sound and lighting considerations.

The use of material from all other non-broadcast and domestic videotape formats is not permissible except in exceptional circumstances. Their use must always be fully discussed and agreed in advance with Executive Producer

3.3 Picture quality requirements for SD and HD programs

Pictures should normally be sharply focussed, free of excessive overshoots and exhibit no perceptible levels of noise. Black or white crushing in the main areas of interest should be avoided and colours, especially skin tones, should be natural.

Pictures should be appropriately stable and free of camera shake and bumps. This does not mean that hand-held cameras should not be used, but rather that image stability should be appropriate to the style and location of the film being made.

Movement of the camera and movement of object across the frame should be smooth.

Computer generated graphics (CGI) should be appropriately sharp and clear and exhibit smooth movement.

Titles and credits should be legible and exhibit smooth movement, particularly vertical credit rolls

Pictures should not contain any visible artifacts, shifts, excessive noise or film dirt.

It may sometimes be appropriate to alter normal camera focus, contrast, image stability and use electronic

processing for artistic effect. However this should be discussed and agreed in advance with the Executive Producer before any images are captured.

3.4 Special Picture Quality Requirements for HD Delivery.

Pictures should normally be sharply focussed, free of excessive overshoots and exhibit no perceptible levels of noise. Black or white crushing in the main areas of interest should be avoided and colours, especially skin tones, should be natural.

The enhanced clarity of HD images means that there is even less room for complacent focussing. Therefore, attention to sharp focus and control over depth of field is a critical element of HD production. Back-focus adjustment should be checked at regular intervals throughout shooting.

The enhanced clarity and contrast of HD images also means that every last detail – even unwanted detail – will be captured on screen. Therefore, picture content must be scrutinized carefully to ensure that things like makeup, costumes and set design are exactly right.

Pictures should be appropriately stable and free of camera shake and bumps. This does not mean that hand-held cameras should not be used, but rather that image stability should be appropriate to the style and location of the film being made. Movement of the camera and movement of object across the frame should be smooth.

The large physical size of HD screens means that image instability can become much more disturbing than on a smaller SD screen. Therefore, HD cameras should be proportionally more stable than in an SD situation and pans should generally be slower and smoother, particularly if a progressive format is used.

It may sometimes be appropriate to alter normal camera focus, contrast, image stability and use electronic processing for artistic effect. However this should be discussed and agreed in advance with the Executive Producer before any images are captured.

Computer generated graphics (CGI) should be appropriately sharp and clear and exhibit smooth movement.

Titles and credits should be legible and exhibit smooth movement, particularly vertical credit rolls.

The enhanced resolution of HD images means that much smaller fonts may be used. However, all titles and credits should be checked in an SD environment, because use of a smaller font may result in down-converted material to be illegible. This would be a case for rejection.

3.5 Use of SD material in HD programs.

For HD delivery, programs must be substantially acquired, post produced and delivered in High Definition.

HD programs may normally contain a *maximum* of 25% non-HD material. HD programs that contain in excess of 25% non-HD material *will not be able to be sold* in premium HD markets.

The following formats are considered to be Non-HD material:

- All standard definition (SD) video formats
- HDV from all manufacturers
- Cameras with image sensors under 1/2"
- Frame based recording formats below 100Mbs
- Intra-frame based recording formats below 50Mbs
- 16mm and Super16 film, whether transferred to tape in high definition or not
- 35mm film transferred to standard definition tape formats
- Non linear editing codecs with bit rates below 160Mbs
- Live contributions via links at less than 60Mbs (MPEG2)

The use of these formats is **not** permissible unless it falls into the categories described in Section 1.3 "Relaxation

of Standards: Exemption Categories". The upper limit for such non-HD content in a program is 25%, even if it falls into one of these categories.

All instances of non-HD material usage **must be** approved in advance with the Executive Producer

All instances of approved non-HD material must be upconverted to full screen HD specification.

To achieve the best possible quality of up-converted non-HD material, particular care should be taken and only high quality up-conversion equipment should be used. Use of "in VTR" up converters or up conversion using non-linear editing software may not be acceptable.

3.6 Use of Electronic Video Processing

Due to international distribution of FAL program masters and the potential requirement for standards conversion, any use of video processing must be agreed with the Executive Producer. This includes the use of film effect and noise reduction.

Standard Definition Standards Conversions

The use of Motion Compensating (sometimes know as Motion Predictive or Motion Vector) Standard Converters is preferred.

High Definition Standards Conversions

As they become available the use of Motion Compensating HD standards converters is preferred. It is also acceptable to use speed change to transfer between High Definition standards as long as the due attention is given to the audio. Currently, speed change is the preferred method of changing between 25 and 24 frame HD standards

Down Conversions

Currently it is acceptable to use a broadcast VTR's "on board" down-converter to produce standard definition copies of high definition programs.

Particular attention should be paid however to rolling credits, small fonts and fine detail which may be lost in the down conversion process

Up Conversions

Where it is permissible to use standard definition material in a high definition program, care must be taken to deliver the best possible quality. This is *particularly* important when material has to be standards converted as well as up converted. Use of all standard definition material **must** be cleared in writing with the Executive Producer.

Film Effect - Standard Definition

Film Effect is a technique used in post-production that mimics the look of film acquisition at 25fps. It creates 25 progressive images per second as opposed to 50 interlaced fields per second.

*Not all programs suit Film Effect/Progressive acquisition. Refer to **Appendix 1: Framerates - choice of acquisition format** as a guide.*

Unfortunately, most conversion methods to achieve film effect in post, *reduce* the resolution of the image as well as introducing flicker on motion. If so-called film motion is required it may be a requirement to deliver film and non-film motion versions. Not all territories will accept conversion of interlace to progressive.

Currently, only film effect processes that attempt to maintain the full resolution of the original are acceptable.

Straight field duplication is *NOT* acceptable as this does not result in a full resolution result.

Simple addition of interlaced field pairs to create a progressive image is *NOT* acceptable, except for shots with no movement whatsoever, as this creates annoying and unnatural jitter and motion artifacts.

NB: Some new SD broadcast cameras now have Interlace and Progressive capture options. Where film motion is a requirement, the use of progressive capture is the preferred method.

The Executive Producer must be informed in advance if a film effect process is to be used in post.

Film Effect - High Definition

Most High Definition cameras can now capture in both Interlace and Progressive modes. Where film motion is a requirement, the use of progressive capture is the preferred method.

It is *NOT* acceptable to *add* film effect in postproduction to interlaced high definition images for high definition delivery, as this will *reduce* the effective image resolution.

When shooting progressive mode, normal film rules apply. At certain speeds, eg. when subjects or camera movement takes about 3 seconds to cross the field of vision, the frame rate causes an unacceptable amount of judder.

Flashing Images and Repetitive Patterns

Flickering or intermittent lights and certain types of repetitive visual patterns can cause problems for some viewers who have photosensitive epilepsy.

Television is by nature a flickering medium (because of the 50 Hz refresh rate of typical receivers and the 25Hz effects of interlaced scanning) and it is therefore not possible completely to eliminate the risk of television causing convulsions in viewers with photosensitive epilepsy. However steps can be taken to reduce unnecessary risks.

The following guidance on the major factors involved is provided for reference. However, the "ITC guidance note on flashing images" (available online) should be consulted for complete information.

- Rapidly flickering images should not change at a fast rate i.e. less than 360ms (9 frames at 25 frames per second) between each flash.
- If brightness changes for a given area of a picture are less than 25% of screen maximum brightness then that area may be discounted.
- In marginal cases such images should be avoided if they are positioned near the centre of the screen.
- Changes in colour are not a problem unless they affect the red channel substantially.
- Prominent and regular patterns which cover a large proportion of the picture area should be avoided, especially if they represent bars, spirals, or 'dartboard patterns'. Moving or flickering regular patterns are particularly hazardous.
- Care needs to be taken also with computer generated images, which, if highly detailed, can cause a high degree of 25Hz inter-line flicker in the displayed television picture. Video luminance level as measured on a waveform monitor does not simply equate to screen luminance (brightness) and cannot be used to assess brightness without correcting for Gamma.

3.7 Titles and Credits

Titles and credits should be legible and sensibly placed within tilte safe areas (see below)

Titles and credits must be compatible and suitable for broadcast in an SD analogue environment

3.8 Audio Quality Requirements and Sync

Audio signals must be suitable for reproduction in a domestic environment. Dynamic range should be restricted and changes in loudness controlled so that the viewer has no need to adjust volume during or between programs. All stereo recordings must provide good mono compatibility.

The audio shall be free of spurious signals such as noise, hum and cross-talk.

Excess sibilance, distortion, wow and flutter shall not be apparent.

The audio shall not show dynamic and frequency response artefacts as a result of the action of noise reduction or low bit rate coding systems. Audio compression should be used as little as possible as the effects of compression used for broadcast distribution and transmission can exacerbate impairments.

Sound to vision synchronization (Sync)

The relative timing of sound to vision should not exhibit any perceptible error at any point in the program.

Sound must not lead vision in excess of one frame at 25fps.

A sound delay of greater than one frame can be acceptable where this occurs in context to give a perception of distance.

4. DELIVERY REQUIREMENTS FOR MASTER VIDEOTAPES

4.1 Technical Acceptance Procedures

All programs delivered on videotape will be subject to a Technical Check prior to acceptance. Any programs failing to meet the required technical standards, or in breach of other acceptance requirements will be referred back to the supplying production company for rectification at the suppliers cost.

4.2 SD Standard Definition Videotape Format

Programs should be delivered on **Sony Digital Betacam** component videotape format and shall replay to the ITU Rec 656 interface standard. During the production process the highest technical standards must be maintained so that the delivered program achieves the required standards. In all cases the submitted videotape recordings must be fully compliant with the manufacturer's technical specification thereby ensuring format compatibility.

- PAL 625 interlaced
- 16x9 Full Height
- Stereo Audio
- Two (2) identical copies required

4.3 HD High Definition Videotape Format

Programs should be delivered on **Sony HDCam** component videotape format and shall comply with the SMPTE 274-1998 and SMPTE 295 1997 standards. During the production process the highest technical standards must be maintained so that the delivered program achieves the required standards. In all cases the submitted videotape recordings must be fully compliant with the manufacturer's technical specification thereby ensuring format compatibility.

- HD 1080 interlaced
- 16x9 Full Height
- Stereo Audio
- Two (2) identical copies required

4.4 Tapeless delivery

FAL does not at this stage accept non-videotape (file) delivery of its programs.

4.5 Recording Reports

Every tape submitted must be accompanied by a completed recording report. The report must include full details of the program supplier and recording facility house and program title/ subtitle. It must also include technical information including the origination format, timecode of first frame of picture (FFOP) and details of the aspect ratio and safe areas used.

The recording report must provide clear references to any part of the program content that may attract low grades (especially below grade 3).

The recording report should provide clear references to any part of the program content that has been previously approved as exempt from normal requirements by the Executive Producer

4.6 Line-up Test Signals and Leader

The start of program and any subsequent part should be preceded by an ident board indicating program title, subtitle, episode number, duration and audio configuration.

Each program part must also be immediately preceded with a countdown clock.

The clock must provide a clear countdown of at least 10 seconds cutting to black at two seconds prior to the start of the program.

The clock must contain a shape that should appear round when viewed on a screen of the same aspect ratio the program is intended to be viewed on. E.g. The clock on a 4 x 3 program must appear round on a 4 x 3 display. The clock on a 16 x 9 program must appear round on a 16 x 9 display. This is a quick operator check for correct aspect ratio.

Lineup signals and Leader should be recorded as follows

Timecode	Picture	Audio 1	Audio 2	Audio 3	Audio 4
09.57.00.00 (or earlier)	EBU Bars (100/0/75/0) (NTSC converted bars are not acceptable)	1000Hz Line up Tone at – 18dBfs (PPM4)	1000Hz Line up Tone at – 18dBfs (PPM4)	1000Hz Line up Tone at – 18dBfs (PPM4)	1000Hz Line up Tone at – 18dBfs (PPM4)
09.59.30.00	Ident Board	Silence or audio ident	Silence or audio ident	Silence or audio ident	Silence or audio ident
09.59.40.00	Black	Silence	Silence	Silence	Silence
09.59.50.00	Clock	Silence	Silence	Silence	Silence
09.59.58.00	Black	Silence	Silence	Silence	Silence
10.00.00.00	Program	Master Left (Lt)	Master Right (Rt)	M&E Left (Lt)	M&E Right (Rt)
End of program	Minute of black	Silence	Silence	Silence	Silence
End of program + 1 minute	Clean Backgrounds - Titles and credits (cut points should match). Including logos and graphic overlays where applicable.				

4.7 Recorded signal levels:

In line with PAL specifications, the video signal decoded to RGB shall not lie outside the levels corresponding to black level and white level, apart from transient overshoots. This corresponds to luminance never lying outside its nominal black 0% and white 100% bounds.

Program sound and vision maximum levels must always correspond to the recorded reference tone and color bar line-up signals according to the following maximum tolerances:

- Black shall lie no more than 1% (or 2 bits) below nominal black level.
- Peak White shall lie no higher than 3% (or 7 bits) above nominal white level.
- When decoded to RGB each component signal must not lie above 105% or below -5%.
- Sound ±1dB.

The audio reference level of digital recordings must correspond to -18dB with respect to maximum audio coding

level, that is the audio reference level (PPM4) corresponds to -18dBFS.

Pre-emphasis of the digital signal must not be used.

Colour signals must be legal in PAL and YUV domains, meeting the PAL specification.

4.8 Textless (Clean) Backgrounds

For the preparation of subtitled foreign versions, FAL requires textless backgrounds to be available for all program elements.

After program end, the supplied tape should contain all backgrounds and material clean of all captions or graphics used in the main program.

Each clean segment should be identified with a timecode indicating location of the original shot in the program.

Heavily subtitled programs should instead supply a separate textless, unsubtitled master tape in the same format as the delivered master.

4.9 Timecode and control track

- Both longitudinal timecode (LTC) and vertical interval timecode (VITC on VBI lines pairs 19 and 21, and 332 and 334) must be recorded throughout the line-up and program and comply with EBU specification. N12-1994 (SMPTE 12M-1995).
- Timecode must be contiguous, coherent and not pass through zero at any point from the start of the first countdown clock to beyond the end of the program.
- LTC and VITC must have identical times.
- If DVITC or ancillary timecode are used then they must be identical to the LTC and VITC.
- Timecode and control track must have the correct phase relationship with the corresponding video signal.

4.10 Audio Track Allocation on Program Master

Audio track allocation must conform to the following standard unless otherwise stated in the program contract.

Audio 1	Audio 2	Audio 3	Audio 4
English language full final mix Left Channel (Lt)	English language full final mix Right Channel (Rt)	M&E Left Channel (Lt)	M&E Right Channel (Rt)

4.11 “Surround 5.1” Audio Delivery

When required by the program contract, 5.1 Surround Audio must be delivered as uncompressed digital WAV files on Hard Disk, flash media or DVD ROM.

Tracks layout should conform to the SMPTE 320M-1999 Standard/ITU-R recommendation BR-1384:

Track 1	Left
Track 2	Right
Track 3	Centre
Track 4	LFE (Low Frequency Effects)
Track 5	Left Surround
Track 6	Right Surround
Track 7	Stereo Left total (Lt)
Track 8	Stereo Right total (Rt)

4.12 Audio Premix Elements

When required by the program contract, premixes and audio elements must be delivered as uncompressed digital WAV files on Hard Disk, flash media or DVD ROM.

Tracks layout should conform to the following standard.

Track 1	Left Full Mix
Track 2	Right Full Mix
Track 3	Left Effects Premix undipped
Track 4	Right Effects premix undipped
Track 5	Left Music mix undipped
Track 6	Right Music mix undipped
Track 7	Dialogue
Track 8	Commentary

5. STANDARD CONTENT FOR FAL PROGRAMS

This document covers key guidelines for programs delivered to FAL for broadcast.

Note that from 1 July 2008 Film Australia Limited will no longer exist, and references to Film Australia will need to be changed to Screen Australia or other wording as determined by Screen Australia.

FAL logo:

There is no requirement for an opening logo.

The words "Film Australia presents" should appear superimposed over program material within 30 seconds of the program start time.

The program shall include the approved Film Australia logo and copyright card at the end of all credits.

Indigenous Warning

Programs that contain images of indigenous people should include an approved form of warning to indigenous viewers. This must be included in the program timings.

Program timing:

Must include title sequence and end credits.

FAL may accept a duration up to 1 min either side of the agreed duration, or as determined by the broadcast license.

Credits timings

Credits sequences may be subject to time restrictions; please check your production contract for details of these.

Program trails/Recaps:

Program trails are acceptable should the program air in more than one part, but the commentary should avoid time references such as "next week..."; "tomorrow..." and instead refer to "in the next episode".

Websites listed in credits

FAL or coproduction partner website addresses are acceptable; however, any other website addresses should be removed unless provided for in the production contract.

Program 'stings':

Stings used in programs to separate program sections should be provided clean of English language captions/graphics in the textless version and/or as part of the clean backgrounds.

6. GLOSSARY AND DEFINITIONS

6.1 Executive Producer (EP)

The Executive Producer shall be the Executive Producer assigned to the program, or the Head of Production, or the CEO, Film Australia Limited.

Approval for exemptions to any of the specifications in this document must be signed off by the Executive Producer. (see *Appendix 2: Applications For Exemption*)

6.2 Music And Effects Track (M&E)

Documentaries:

We accept final mix minus commentary, this means:

No commentary, no extra readings or voiceovers should be on the music and effects. The levels should not be dipped.

If a contributor appears in vision, their voice must continue through that piece on the M & E tracks, even if they are not in vision throughout.

Drama:

100 per cent fully filled effects, footsteps and foleys to be supplied which includes the atmospheric effects of crunching gravel, background atmos etc.

No speech should be heard at all on m/e.

Exceptions

Exceptions to these variations may be acceptable depending on the program content. If in doubt, contact the FAL Technical Staff for further advice.

6.3 Clean Backgrounds (Textless Backgrounds)

These are used for Broadcasters to translate the text superimposed over programs into their own language.

The clean shots should be continuous and from cut point to cut point to enable the clients to drop in the section.

Where there are effects or dissolves, the clean background should be extended to the next clean cut point

Clean backgrounds should be supplied for opening sequences and closing credits.

If this cannot be provided clean due to digitally created titles then some kind of alternative background or graphic element should be supplied. Contact the FAL Technical Staff for further advice.

7. USEFUL CONTACTS

What	Who	Contact
General Technical queries Quality Control advice	FAL Technical Staff	Peter Litton 94138684
Delivery Items & Clearances	Business Affairs Manager	Liz Stevens 94138627 Martein Coucke 94138713
Exemptions from Standards (see Section 1.3)	Executive Producers	Mark Hamlyn Penny Robins Anna Grieve

8. Appendix 1: CHOICE OF ACQUISITION FRAMERATE

This is a guide to which framerates are appropriate for certain genres and uses. It is not prescriptive and is designed to be a help for producers.

For more discussion regarding the implications of using certain framerates in post production, please contact the FAL Technical Staff on 02 9413 8684.

Production style	25p (Progressive)	50i (interlaced)	Reason
Documentary	Possible. Better match with film archival footage	Possible. Better match with video archival footage	Depends on style of doco and what effect you are trying to achieve.
Drama with Cinema release	Yes. Possibly 24p	No	Compatibility with 35mm film
Television Drama	Yes	If you want a video look	If shot progressive, could have a cinema release
Soap Opera	possibly	likely	More likely to want the "immediacy" of interlace
Sport	unlikely	Almost always	Fast movement requires smooth motion
Live events	possible	likely	More likely to want the "immediacy" of interlace
Natural History	likely	sometimes	Fast motion is often captured smoothly by overcranking
News and current affairs	unlikely	likely	Interlace gives a more appropriate "real life" feel and matches better with interlaced archival footage

NOTES:

- Progressive footage typically results in a more cinematic, illusionary, formal feel to images. Motion can be jerky at certain speeds.
- Progressive footage **can** be technically converted to interlaced in postproduction, however the "film look" is retained.
- Interlaced footage typically results in a "live", "real life" feel to images. Motion is smooth.
- Interlaced footage **cannot** be successfully changed to progressive in postproduction without significant loss of resolution.
- Progressive scan images can be more stable and sharp than interlaced, when shown on a progressive scan screen, however with interlaced screens there is no benefit.

9. Appendix 2: EXAMPLE - APPLICATION FOR EXEMPTION FROM TECHNICAL STANDARDS

Name of Production: Date: Completed by:		
Technical requirement	Exemption sought and reason	Executive Producer Approval
<i>Example: Use of SD material in excess of the 25% maximum</i>	Example: EXEMPTION: Early Television The program will contain significant quantities of archival video footage from the 1970's that is not available in any other format. This footage will be upconverted to HD and graded using a daVinci grading facility. The footage will be used clearly indicating that it is archival footage.	Approval given conditional on broadcaster acceptance. (EP signed)
<i>Example: Pictures shall be free of video noise</i>	Example: EXEMPTION: Historic Interest There is a shot at 05:02:04:12 that shows prisoners escaping from an underground tunnel. The footage is noisy, but is of historical significance	Approval given – the noisy content is essential to the program. (EP signed)

There are five recognised categories for technical exemption:

- **Artistic interest** Innovative or experimental productions which are made, of necessity, by those who do not have access to equipment or facilities meeting broadcast quality standards.
- **Historic interest** News or programs of a documentary nature which show historic events taking place or whose subject matter requires the use of archive material.
- **Actuality material** News, features or documentaries of an actuality nature where better quality has not been possible because of limitations placed on the format or physical size of equipment used. Such limitations are those incurred as a result of shooting in difficult areas such as war zones, isolated locations, confined spaces or other difficult environments.
- **Early television and cinema** Excerpts from historical archives where low technical quality was due to the then-current performance of equipment used in its creation, or where quality is now lower than at the time of original showing because of film or video ageing.
- **Home videos** Programs which employ excerpts using domestic video equipment in which the context requires that these are used.
NOTE: This is not permissible in HD masters.

NOTE: Programs to be delivered on HD masters have much more stringent quality requirements, and exemptions need to be sought at a very early stage of pre-production if these are to be accepted.

10. Appendix 3: APPLICATION FORM - EXEMPTION FROM TECHNICAL STANDARDS

Name of Production: Date: Form Completed by:		
Technical requirement	Exemption sought and reason	Executive Producer Approval