

## EBU Technical Information I32-1997

### The Use of Super 16 mm Film for Television Production

<i>EBU Committee</i>	<i>First issued</i>	<i>Revised</i>	<i>Re-issued</i>
PMC	1997		

**Keywords:** Film, 16:9 Telecines

#### **1. Introduction**

This EBU Technical Information document reports on the way and extent that EBU Members and their programme suppliers use Super 16 mm film in 4:3 and 16:9 television production.

A questionnaire was sent to EBU Members and other organisations involved in programme production for EBU Members. Replies were received from 36 organisations; 31 broadcasting organisations and 5 film and/or video post-production organisations. The replies showed that 26 organisations were using Super 16 mm; 22 of these were broadcasters located in Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Japan, Greece, the Netherlands, Norway, Poland, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

The present Technical Information document is based on the replies to the questionnaire.

In a parallel exercise, the EBU has attempted to give a comparison between the costs of using Super 16 mm and 35 mm film for television production. This comparison is given in Appendix 1

#### **2. Main Applications of Super 16 mm Film**

##### ***2.1 Types of programme produced on Super 16 mm film***

Super 16 mm film is mainly used for single camera drama and documentary production. The final product may be intended for television release only, or, in the case of a co-production, it may be intended for both television and cinema release.

##### ***2.2 Reported advantages in the use of Super 16 mm film***

The reported advantages of producing in Super 16 mm film, as compared to 35 mm film, are lower costs of camera film and equipment, lower costs of film laboratory services, and a smaller technical staff needed for shooting.

The reported advantages of Super 16 mm film, as compared to video-production, are better future proofing and greater ease of co-production. Another reported advantage is the greater flexibility and creative freedom.

##### ***2.3 Post-processing***

A variety of production methods are used in the post-production of source material on Super 16 mm film. The negative film may be the source material for a telecine transfer in a video production, or it may be the source material for a traditional film production, resulting in a release print on 35 mm film for cinema and/or television presentation.

More sophisticated editing methods, combining film and video technology, are also used. These exploit machine-readable frame-address data recorded on the film, to perform off-line video editing. The source material is subsequently conformed for presentation either on film or on video or on both.

#### ***2.4 Distribution of programmes produced on Super 16 mm film***

Super 16 mm film has an image aspect ratio of 1.66:1 which is quite close to the 16:9 of wide-screen television systems. On 4:3 television, the film is either transmitted as a full screen display, with parts of the picture cropped, or in a "letterbox" presentation, with black areas top and bottom.

In the case of co-productions when a programme on Super 16 mm film is also to be released in the cinema, this is done by blowing up the Super 16 image onto 35 mm. This produces a print for projection with a 1.66:1 image format.

#### ***2.5 Archival of Super 16 mm film***

Most users of Super 16 mm film archive their programmes as videotape.

About 50% of the users also archive an edited negative film and a film show print.

### **3. Operational experience**

#### ***3.1 Production planning***

Users did not report any major operational problem in planning productions that use Super 16 mm film. However, some users reported a need for the operational crew to become familiar with the operational implications underlying the image differences between the 1.66:1 and the 16:9 formats

#### ***3.2 Shooting***

Some users reported problems in picture framing during shooting, due to the difference between the 1.66:1 aspect ratio of the image actually exposed on the Super 16 mm film, and the 16:9 aspect ratio that is used for broadcasting.

Additional problems in picture framing were sometimes met, due to the difference between the standards for the image area exposed on the film, and the "default" area scanned by telecines.

#### ***3.3 Film processing***

Many users of Super 16 mm film reported some problems with film laboratory services. The basic problems mentioned were mechanical problems, dirt and scratches. These are due to the small picture area and narrow guidance area available for film transportation.

Some users also noted that a full range of purpose made Super 16 mm equipment was not available. Consequently they had to use modified Standard 16 mm equipment.

#### ***3.4 Telecine transfer of Super 16 mm film to video***

Some users made critical remarks on the quality of pictures obtained from the telecine transfer to video. The performance of telecines is challenged by the Super 16 mm film, particularly in areas of picture steadiness, flatness of field and corner sharpness.

### ***3.5 Picture quality***

Most users of Super 16 mm film expressed satisfaction with the quality of the picture that can be obtained from Super 16 mm film when it is transferred from the original camera negative. Some users indicated a preference to use slower speed camera films to provide less grain and better sharpness.

Users also pointed out that picture quality very much depends on using proper equipment and on careful handling. Super 16 mm film is very delicate as compared to 35 mm film.

### ***3.6 Mixed film and video production***

When Super 16 mm film is used in a mixed film and video production environment, users often commented on the technical and artistic complexity of the long production chain from shooting to the final product on video and/or film. The merging of film and video technologies exploits the best properties of both and offers possibilities for future presentation on either video or film. However, the understanding of the technology and the procedures and also the equipment still need to be improved before such methods reach stability and become fully cost effectiveness.

In particular, users reported the need for improved methods and equipment for interfacing image and sound address data on time code or keycode that is exchanged during post production and final conforming. However these problems are not specific to the use of Super 16 mm.

## **4. Conclusion**

The following main conclusions emerged from the replies to the questionnaire:

- Super 16 mm film is widely used for production of television programmes in Europe.
- Users generally appreciated the recording and storage properties of Super 16 mm film as well as its flexibility and future-proofness.
- The main area of use of Super 16 mm film is for drama and for documentary programmes.
- A variety of production methods are available, that combine film and video technologies.
- Production may be aimed at an end product on film or on video, for transmission in 16:9 and/or 4:3 television.
- Production costs and quality aspects make Super 16 mm film an attractive alternative to 35 mm film for co-productions.
- The Super 16 mm film format is more critical to handle, but most users have now overcome their initial problems and are satisfied with the results that can be achieved.
- Merging film and video process technology offers many technical and artistic opportunities, but improvements to interfaces and the better understanding of the methods are still needed to improve production stability and cost-efficiency.

### **Appendix to EBU Information I...-1996**

#### **Super 16 mm film or 35 mm film for Television Production: A comparison of the costs**

## 1. Introduction

It is a complex matter to compare the difference in cost between the use of Super 16 mm film and 35 mm film for a television production. This is because the way film is used in a television production can be very different from the tradition way of making programmes on film. Therefore it is necessary to itemise the costs of equipment rental, film material and film laboratory services. Film laboratory costs are particularly difficult to itemise because, in different countries or markets, the costs of individual processes are listed and computed differently. It was therefore decided to avoid individual process cost comparison and instead look at the cost of blocks of processes.

The blocks selected for costing were:

- camera equipment rental,
- camera negative raw-stock purchase and negative development,
- rush print for editing on film,
- camera negative conforming and grading, answer print and show print,
- Super 16 mm blow up to 35 mm for multiple printing for cinema projection.

The programme example chosen for the cost comparison was:

- category drama production,
- duration 90 minutes
- number of scenes 800
- shooting days 30
- shooting ratio 1:12
- negative raw-stock footage 30 000 m for 35 mm
- negative raw-stock footage 12 000 m for Super 16 mm
- amount of rush printing 66%.

Information on costs for these processes was received from France, Germany, Norway, Sweden and the UK.

Using these prices, the film costs of a number of typical production methods used for television were calculated. When major differences in the costs of the film processes were identified, these (expressed as ratios) are shown in the tables below. Costs of film processes which could not be differentiated between the use of Super 16 mm and 35 mm film, as well as the costs of video processes were not included. Furthermore, taxes and discounts were not taken into account.

It must be understood that the cost differences detailed below are only a small part of the total production costs of a programme. For instance, the present analysis only considers costs of those film processes (camera rental, raw stock, laboratory services, etc.) where the costs were found to be different for the use of Super 16 mm and 35 mm. The total above-the-line costs for the production of the assumed programme will be much higher than the film costs shown here.

## 2. Major areas of difference in above-the-line costs

For Super 16 mm film, a reduction in rental cost is expected, due to less expensive equipment. A reduction is also expected in the cost of raw-stock, due to the narrower film gauge used. Film laboratory services is also expected to be less expensive whenever less raw-stock material is used.

However, when a programme shot on Super 16 mm is to be presented in the cinema, there are extra costs for printing onto 35 mm film.

**Table 1**  
**Cost comparison between Super 16 mm film and 35 mm film**

(Costs in local currency)

	Norway		Sweden		UK		France		Germany	
	S16	35	S16	35	S16	35	S16	35	S16	35
Camera Equipment rental	175	245	130	260	11.0	20.0	150	240		
cost ratio	1:1.4		1:2.0		1:1.8		1:1.6			
Neg. stock & Neg. Develop	137	487	139	491	12.0	37.0	140	500	40	125
cost ratio	1:3.6		1:3.5		1:3.1		1:3.6		1:3.1	
Rush Print (66%)	90	224	79	198	5.0	14.4	92	318	32	75
cost ratio	1:2.5		1:2.5		1:2.9		1:3.5		1:2.4	
Neg. Cut, Grade, Prints <sup>1</sup>	158	237	140	197	5.7	9.9	82	134	29	37
cost ratio	1:1.5		1:1.4		1:1.7		1:1.6		1:1.3	
<b>Totals</b>	<b>560</b>	<b>1193</b>	<b>488</b>	<b>1146</b>	<b>33.7</b>	<b>81.3</b>	<b>464</b>	<b>1192</b>		
<b>cost ratio</b>	<b>1:2.1</b>		<b>1:2.4</b>		<b>1:2.4</b>		<b>1:2.6</b>			

**Table 2**

**Break-down of costs in the production process**

(Costs in local currency)

	Norway		Sweden		UK		France		Germany	
	S16	35	S16	35	S16	35	S16	35	S16	35
Camera Equipment rental	175	245	130	260	11.0	20.0	150	240		
% of total cost	31	20	27	23	32	25	32	20		
Neg. stock & Neg. Develop	137	487	139	491	12.0	37.0	140	500	40	125
% of total cost	25	41	28	43	36	45	30	42		
Rush Print (66%)	90	224	79	198	5.0	14.4	92	318	32	75
% of total cost	16	19	16	17	15	18	20	27		
Neg. Cut, Grade, Prints 1	158	237	140	197	5.7	9.9	82	134	29	37
& of total cost	28	20	29	17	17	12	18	11		
<b>Totals</b>	<b>560</b>	<b>1193</b>	<b>488</b>	<b>1146</b>	<b>33.7</b>	<b>81.3</b>	<b>464</b>	<b>1192</b>		
<b>% of total cost</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>		

**Table 3**

**Additional costs to make 35 mm release prints from a Super 16 mm negative**

	Norway	Sweden	UK	France	Germany
S16 to 35 intermediate. pos. 35 intermediate. Negative 35 release print	273	267	28.3		

---

1 Costs for "Prints" include answer prints & show prints

### 3. Examples of cost ratio differences for typical production methods using film for television

#### 3.1 *Traditional film production for broadcasting*

(shooting on film - editing on film - finishing on showprint for transmission)

	Super 16 mm	35 mm
Camera equipment rental	1	1.4 - 2.0
Camera rawstock, neg. development	1	3.1 - 3.6
Rush print	1	2.4 - 3.5
Neg. cut, grade answer & show print	1	1.3 - 1.7
<b>Overall</b>	<b>1</b>	<b>2.1 - 2.6</b>

#### 3.2 *Film - video - video production method*

(shooting on film - video post production - video transmission)

	Super 16 mm	35 mm
Camera equipment rental	1	1.4 - 2.0
Camera rawstock, neg. development	1	3.1 - 3.6
<b>Overall</b>	<b>1</b>	<b>2.4 - 2.6</b>

#### 3.3 *Film - video - film production method*

(shooting on film - editing on video - finishing on film with showprint for transmission)

	Super 16 mm	35 mm
Camera equipment rental	1	1.4 - 2.0
Camera raw-stock, neg. developing	1	3.1 - 3.6
Neg. cut, grade, answer & show print	1	1.3 - 1.7
<b>Overall</b>	<b>1</b>	<b>2.1 - 2.4</b>

#### **4. Conclusion**

In using film to produce television programmes there is a cost aspect depending of how film is used. The basic element of cost difference is in choice of the film format. The cost of film rawstock is directly related to the film width and footage. This affects the cost of shooting and of the following film laboratory services for handling and printing.

Using film for television production can be different from the traditional film production method. Differences depend on the choice of the post-production concept (film or video) and on whether the final product is conformed on film or video.

When comparing different integrated film-and-video production methods, it is necessary to itemise the cost of each step in the production process. This conflicts with the traditional pricing concepts for film production, and makes it essential to understand in detail the quoted price lists. Also, film laboratory prices are dependent on the local market conditions.

Typically, the cost for camera rawstock and development of Super 16 mm may only be a quarter of that of using 35 mm film.

For the traditional film production method, ending up with a show print, the cost of using Super 16 mm film is less than half that of using 35 mm film. In a production method where the programme is post produced and finished on video, the cost of using Super 16 is also less the cost of using mm 35 mm film.

Drama and documentary production is an area where film is widely used by broadcasters. In the case of co-productions that are finished on video for television transmission as well as on film for cinema presentation there is, however, the expensive process of making intermediate materials for multiple release printing.

#### **5. Acknowledgement**

The material presented in this Appendix has been prepared by Project Group P/S16 of the EBU Production Technology Management Committee.