

Step Optical Reduction Printing of 35-mm Images to 16-mm Prints and Duplicate Negatives



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1. Scope

This practice specifies the dimensions of the minimum picture area on 16-mm film made from 35-mm images by step reduction printing.

2. Objectives

2.1 This practice specifies the maximum reduction ratio in step optical printing necessary to provide the minimum image area as specified in American National and International Standards.

2.2 The specified dimensions apply to the image area only, taking into account that printer apertures may be reduced to avoid stray light from clear framelines or increased to provide dark surround about prints or certain intermediates.

3. Dimensions

3.1 The height and width of the 35-mm negative and positive image are established by American National Standard Dimensions of 35-mm Motion-Picture Camera Aperture Images, ANSI PH22.59-1974 (R1981). The size of the positive image is also controlled by PH22.59 because all the negative area is used when prints are derived as specified by American National Standard Dimensions of Exposed Areas for Picture and Photographic Sound on 35-mm Motion-Picture Prints Made on Continuous Contact Printers, ANSI PH22.111-1982.

3.2 For the production of 16-mm positive prints or intermediates from images with clear (low density) surround, the following dimensions are recommended:

3.2.1 The minimum height of the 35-mm image to be printed shall be 15.95 mm (0.628 in).

3.2.2 The minimum width of the 35-mm image to be printed shall be 21.90 mm (0.862 in).

3.2.3 The size and location of the reduced 16-mm image and surround will be in accordance with American National Standard for Motion-Picture Film (16-mm)—Printed Areas—Picture and Sound Contact Printing, ANSI PH22.48-1983, except that a B minimum value of 7.42 mm (0.292 in) is adopted to conform to the specified

minimum image area and to the maximum reduction ratio (see Note 2).

3.2.4 The maximum reduction ratio for step optical printing is 2.15:1.

3.3 For the production of 16-mm duplicate negatives or intermediates from images with dark (high density) surround, the following dimensions are recommended:

3.3.1 The minimum height of the 35-mm image to be printed shall be 16.00 mm (0.630 in).

3.3.2 The minimum width of the 35-mm image to be printed shall be 21.95 mm (0.864 in).

3.3.3 The size and location of the reduced 16-mm duplicate negative image will be in accordance with American National Standard for Motion-Picture Film (16-mm)—Camera Aperture Image, ANSI PH22.7-1983, except that a B minimum value of 7.42 mm (0.292 in) is adopted to conform to International Standards.

3.3.4 The maximum reduction ratio for step optical printing is 2.15:1.

Notes:

1. Metric dimensions are primary in this recommended practice.

2. When printing reduced 16-mm positive images according to Section 3.2, it is intended that no transparent frameline be produced. The usual practice is to overlap the printed area by increasing the height of the 16-mm printing aperture. It is also acceptable to butt adjoining areas.

When printing reduced 16-mm duplicate negative images according to Section 3.3, it is intended that the frameline be transparent and that the image area printed conform to International Standards. Therefore a 16-mm printing aperture may be used with a height of 7.42 mm (0.292 in) slightly cropping the height of the image projected toward the 16-mm aperture.

3. If means are provided to round the corners of the 16-mm image, the radius of the corner shall not exceed 0.51 mm (0.020 in).

4. The center of the reduced 16-mm image normally shall coincide with the center of the 35-mm image from which it was printed within ± 0.05 mm (0.002 in).

Appendix

(This Appendix is not part of the SMPTE Recommended Practice, but is included for information only.)

In continuous optical reduction printing, the reduction ratio is determined by the ratio of four times the perforation pitch of the 35-mm film source to one times the perforation pitch of the 16-mm print material. The following table compares image dimensions in step optical and continuous optical printing:

STEP PRINTER	Minimum 35-mm Image to be Reproduced		Image Projected toward 16 mm	
	Height	Width	Height	Width
2.15:1	Positive	15.95 mm 0.628 in	7.42 mm 0.292 in	10.19 mm 0.401 in
	Negative	16.00 mm 0.630 in	7.44 mm 0.293 in	10.21 mm 0.402 in
CONTINUOUS PRINTER 2.49:1	Positive	16.00 mm 0.630 in	6.43 mm 0.253 in	8.80 mm 0.346 in
	Negative	16.00 mm 0.630 in	6.43 mm 0.253 in	8.82 mm 0.347 in

Note that in continuous printing, the picture material from Style A or Style B negatives, as specified in ANSI PH22.59-1974, does not fill the normal 16-mm projector aperture as defined in American National Standard for Motion-Picture Film (16-mm)—Projectable Image Area, ANSI/SMPTE 233-1987. A 35-mm intermediate made

from the 35-mm Style A or Style B original with a 16 percent enlargement will produce a 16 mm print at 2.49:1 reduction, which will fill a 16-mm projector aperture satisfactorily. Also note that a 35-mm original with a Style C image area will be satisfactory for direct 2.49:1 reduction.

Mitchell Camera Corp.
 Mitsubishi Electric Sales America, Inc.
 Mitsubishi Pro Audio Group
 Mole-Richardson Co.
 Montage Group, Ltd.
 Moseley Associates, Inc.
 Motion Picture Assn. of America, Inc.
 Motion Picture Enterprises, Inc.
 Motion Picture Promotion Corp.
 Moviecam F. G. Bauer Filmtechnik
 MPL Film & Video, Inc.
 Multi-Track Magnetics, Inc.
 NAC Inc.
 Nagra Magnetic Recorders, Inc.
 National Assn. of Broadcasters
 National Broadcasting Co., Inc.
 National TeleConsultants, Inc.
 NEC America, Inc.
 Broadcast Equipment Div.
 Boyce Nemece Designs
 Neumade Products Corp.
 Rupert Neve Inc.
 NHK Technical Services Co., Ltd.
 Nikon Inc.
 Norton Associates, Inc.
 Novo Communications, Inc.
 Nurad Inc.
 O'Connor Engineering Labs., Inc.
 Odetics, Inc.
 Optical Disc Corp.
 Orban Associates, Inc.
 OSRAM Corp.
 Otari Corp.
 Pacific Radio Electronics
 Pacific Title & Art Studio
 PALTEX

Panasonic Broadcast Systems Co., Div.
 of Matsushita Electric Corp. of America
 Panavision, Inc.
 Pandora's Other Box Ltd.
 PERROTT Engineering Labs, Inc.
 Peterson International Ent. Ltd.
 Philips Lighting Co.
 Photo-Sonics, Inc.
 Pinnacle Systems, Inc.
 Plastic Reel Corp. of America
 Posso S.A.
 Production Film Makers Associates Ltd.
 Professional Film & Video Equip. Assn.
 Quanta Corp.
 Quantel
 Rank Cintel, Inc.
 Rank Film Laboratories Ltd.
 Rank Precision Industries, Inc.
 RDS Corp.
 Redlake Corp.
 Research Technology International
 Ritz A-V Cine Sound
 Rorke Data Supply, Inc.
 Rosco Laboratories
 RTS Systems, Inc.
 Ryder Sound Services, Inc.
 Sachtler Corp. of America
 Schwem Technology
 Showscan Film Corp.
 Sigma Electronics Inc.
 Skotel Corp.
 Smart Theatre Systems
 Solid State Logic, Inc.
 Sony Corp. of America
 Sony of Canada, Ltd.
 Spectra Systems, Inc.

Steadi-Film Corp.
 Steenbeck, Inc.
 Strand Lighting
 Studer Revox America, Inc.
 Studio S.O.N.
 Sunburst Lighting Inc.
 TASCAM — Prof. Div. of TEAC Corp.
 Teccon Enterprises Ltd.
 Technical Film Systems, Inc.
 Technicolor, Inc.
 Tektronix, Inc.
 Teledyne Camera Systems
 Tentel Corp.
 Theatre Equipment Assn.
 Thomson Video Equipement
 Tiffen Manufacturing Corp.
 Time Logic Systems
 Tintoretto, Inc.
 Todd-AO/Glen Glenn Studios
 Toei Chemical Industry Co., Ltd.
 Total Spectrum Manufacturing, Inc.
 TVC Laboratories, Inc.
 Tyler Camera Systems
 Ultimatte Corp.
 Union Connector Co., Inc.
 United Media Inc.
 Utah Scientific, Inc.
 Video Cable Comunicacion S.A.
 Video Financial Corp.
 Video Post Production Centre B.V.
 Videotek, Inc.
 Vinten Equipment Inc.
 WaveFrame Corp.
 Wide Range Electronics Corp.
 Wiko Ltd.
 YCM Laboratories
 Yokohama Cinema Laboratories, Inc.

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