The latest information on Fastax exposure times was found to be:

$$\text{exposure time} = \tfrac{1}{3} \times \frac{1}{\text{pictures/sec}}$$

according to the Wollensak Optical Co. *Lens and Shutter Guide*. At this stage, the basic exposure of the event is determined from the film speed, the light produced by the flame in foot-candles, and the exposure time.

For a first film, a test exposure is generally used to determine the basic exposure. From previous experience a basic aperture of $f/4.5$ is correct for the example cited. This basic lens opening is now modified by the following factors: reciprocity law failure, filters and effective aperture (as governed by lens extensions). To obtain an effective aperture of $f/4.5$ at the given lens extension, the f-stop setting is changed to $f/1.5$. For the film used, the reciprocity law failure at an exposure time of 1/25,000 sec requires one additional f-stop for neutral-density loss, and the use of a color-compensating filter requires at least an additional $\frac{1}{3}$ f-stop because of the different reciprocity law failure in the emulsion layers. Filtration to compensate for the 200 K difference between illumination and color film balance requires further adjustment, less than $\frac{1}{3}$ f-stop. Thus, the final aperture becomes approximately $f/0.7$. Of course, if a lens of this speed is not available, certain sacrifices have to be made. Either a faster film must be used or a slower framing rate must be selected, each of which again changes part of the calculation.

Rotating prisms present a limitation as to minimum f-number. The limit is near $f/2$ and therefore the use of a faster lens becomes ineffective.

This example of calculating the color exposure is given to show the general approach and the step-by-step procedure. The method is applicable to a wide variety of subjects and filming conditions.

Acknowledgment

The author gratefully acknowledges the help of Henry D. Patterson, who edited the original manuscript. S. Lentz and R. E. Jungo of the Edgar C. Bain Laboratory's Photographic Section contributed greatly in assisting in the field tests. Thanks are also due to the Electrical Department of the United States Steel Research Center for constructing the light sources.

References

1. E. T. Higgons, "Exposure meter for high-speed photography," *Jour. SMPE, 53:* 545–548, Nov. 1949.
2. J. H. Waddell and J. W. Waddell, *Photographic Motion Analysis*, p. 4, Industrial Laboratories Publishing Co., Chicago.
3. A. W. Zorgniotti, R. S. Hotchkiss and L. C. Wall, "High-speed cinephotomicrography of human spermatozoa," *Medical Radiography and Photography, 34:* 44–47, No. 2, 1958.
4. *Photography Through the Microscope*, Eastman Kodak Co., 1957.
5. K. H. Lohse, "Color exposure for high-speed photography of some self-luminous events," *Jour. SMPTE, 67:* 567–571, Sept. 1958.

Errata

"Progress Report," *Jour. SMPTE, 68:* 277–329, May 1959.

On page 310, the FP 20-S Projector with SPP 800 lamp is illustrated in Fig. 61 and described in the text in the section contributed from Germany. Although cited as developed by Philips in Holland, the development might also have been cited in the report from Great Britain where the equipment has received attention. It is hoped that in future Progress Reports a section direct from Holland can be included.

On page 316, an addition of credit should be made for Fig. 76, to read: "Fig. 76. The Tecnoscope Model 110 Printer; camera and projector head are 'Acme,' built in U.S.A. by Producers Sales Corp."

motion-picture standards

Proposed American Standard

A Proposed American Standard, PH22.107, Film Spools for 8mm Motion Picture Cameras, is published here for a three-month period of trial and comment.

This proposed standard was previously published in the January 1956 *Journal* for trial and comment. Comments were received and it was returned to the initiating 16 & 8mm Committee. The method of dimensioning the keys was changed necessitating revisions in the diagram and table of dimensions. Paragraphs 2.4, 3.3 and 3.4 were revised and Appendices were added to improve the clarity of the proposal.

All comments should be addressed to Society Headquarters, attention of J. Howard Schumacher, Staff Engineer, prior to September 15, 1959. If no adverse comments are received, the proposal will then be submitted to ASA Sectional Committee PH22 for further processing as an American Standard.—*J.H.S.*

8mm Motion-Picture Cameras

1. Scope

dimensions shown in this standard
mm motion-picture film spools with
l capacity of 25 ft. These spools are
ameras of the type in which each
n is passed through the camera twice
sure in accordance with American
8mm Motion-Picture Film, Usage in
PH22.21-1953, or latest revision
pproved by the American Standards
n, Incorporated. The spindle holes
ol are shown with splines which are
o assist in assuring correct orienta-
e spool in the camera.

Operation in Camera

n the spool is on the supply spindle,
e with the 3-splined spindle hole,
shall be on the lefthand side (as
the lens).

half of the film adjacent to the
h the 3-splined hole, when the spool
supply spindle, shall be in line with
a lens.

n the spool is on the take-up spindle,
e with the 4-splined spindle hole,
shall be on the lefthand side (as
the lens).

n the loaded camera is viewed
side, with the lens to the left, both
and take-up spools shall rotate in
e direction.

3. Dimensions

dimensions shall be as given in the
and table.

et heads or other fastening devices
eyond the outer surface of the
flange, they should lie within the zone indicated by diameters K and L and be no higher than indicated by G. It is not intended that this standard prescribe the nature or number of these fastening devices.

3.3 Dimension H is the space between the flanges at all points. At all points between the core and the periphery the tolerance shall be ± 0.006 in. Inside the core, including the inner surfaces of the splines, the tolerance shall be ± 0.010 in.

3.4 Dimension J specifies the overall thickness (with the exception of the fastening devices). For the zone immediately surrounding the spindle hole, the tolerance shall be + 0.010 in. (0.25mm). For the rest of the flange area, the tolerance shall be − 0.010 in. (0.25mm) with no limit on the negative tolerance.

3.5 Dimension F specifies the width of slot in the core for attaching end of film.

3.6 It is not intended that the relative orientation of the splines in the two spindle holes (or of the core slot) be specified or implied by this standard.

3.7 The following tolerance applies to the flatness and accuracy of rotation of both the internal and external flange surfaces, including rivets or other fastening devices. When the spool is rotated on an accurate, tight-fitting spindle, the maximum outward deviation from the intended plane for any point on the flanges shall not exceed 0.015 in., (0.38mm). The "intended plane" is defined as a plane normal to the axis of the spindle: for the outer surface of the flange, it shall be coincident with the surface of the flange over an area 1½-in. in diameter centered about the spindle hole. For the inner surface it shall be coincident with the surface adjacent to the core.

NOT APPROVED

(These Appendices are not a part of Proposed American Standard Film Spools for 8mm Motion-P PH22.107, but are included to facilitate its use.)

APPENDIX 1

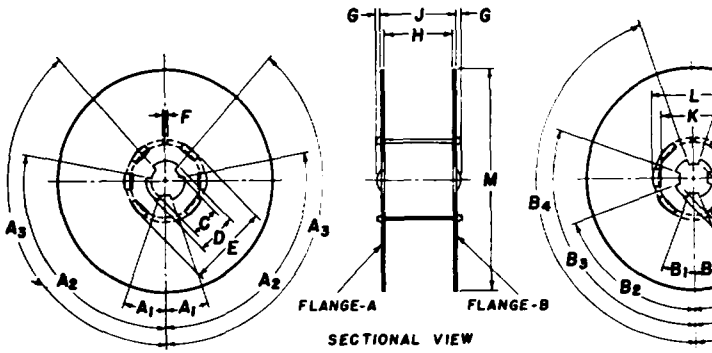
The spool thickness "J" specified by this standard is in accord with current practice for new spools and with the requirements of existing cameras. However, there are in existence and use spoo ranging up to 0.743 in. (18.87mm)

APPENDIX 2

The angular dimensions and tolerances for the width of the keys, "A" and "B" (or tongues), in the spindle holes are in accord with current practice for new spools and with the requirements of existing cameras. However, there are in existence a older design with keys slightly wide each edge of each key.

APPENDIX 3

Camera spindles should allow for a radius of not more than 0.015 in. (0.38mm) at each corner of each key and spline.



SECTIONAL VIEW

Dimensions	Degrees	Dimensions	Inches
A_1	19¼ ± 1	C	0.288 +0.007 −0.004
A_2	100¾ ± 1		
A_3	139¼ ± 1	D	0.384 min
B_1	19¼ ± 1	E	0.750 ± 0.015
B_2	70¾ ± 1	F	0.035 ± 0.020
B_3	109¼ ± 1	G	0.015 max
B_4	160¾ ± 1	*H	0.641
		**J	0.720
		K	0.600 min
		L	0.812 max
		M	2.031 ± 0.015

* See ¶ 3.3
** See ¶ 3.4