

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
WASHINGTON 25, D.C.

NATIONAL BUREAU OF STANDARDS

REPORT OF TEST

182055

on

THREE PHOTOGRAPHIC OBJECTIVES

Submitted by
Fairchild Industrial Products
221 Fairchild Avenue
Plainview, Long Island, N. Y.

I. Focal Lengths

Lens No.	Back Focal Distance	Equivalent Focal Length	Calibrated Focal Length
	mm	mm	mm
MS5451	120.44	153.09	153.12
UF7360	121.18	154.02	153.99
MF8386	121.26	153.66	153.65

The values of the focal lengths have been selected to give best average definition across the entire negative and do not necessarily correspond to those values of focal lengths which give best definition on the axis. The probable errors of these determinations of focal length do not exceed ± 0.10 mm.

II. Distortion

1. Distortion referred to the equivalent focal length

Lens No.	5°	10°	15°	20°	25°	30°	35°	40°	45°
MS5451	0.00	0.00	0.02	0.04	0.07	0.11	0.13	0.11	-0.09
UF7360	0.00	0.00	0.01	0.03	0.06	0.09	0.11	0.06	-0.15
MF8386	0.00	0.00	0.01	0.04	0.07	0.10	0.11	0.06	-0.13

2. Distortion referred to the calibrated focal length

Lens No.	5°	10°	15°	20°	25°	30°	35°	40°	45°
MS5451	0.00	0.00	0.01	0.03	0.06	0.09	0.12	0.09	-0.12
UF7360	0.00	0.00	0.02	0.03	0.07	0.10	0.12	0.08	-0.12
MF8386	0.00	0.00	0.02	0.04	0.07	0.10	0.12	0.07	-0.12

The values of the distortion are measured in millimeters and indicate the displacement of the image from its distortion-free position. A positive value indicates a displacement from the center of the plate. The probable error does not exceed ± 0.01 mm.

III. Resolving Power

Lens No.	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°
MB5451										
Tangential	53	53	46	39	32	27	23	23	23	14
Radial	53	53	53	46	46	39	39	32	32	32
UF7360										
Tangential	53	53	46	46	46	39	39	32	23	14
Radial	53	53	53	53	53	53	53	46	46	32
MF8386										
Tangential	53	53	46	32	27	27	27	27	32	19
Radial	53	53	53	53	53	46	53	46	46	32

The values of the resolving power are given at 5° intervals from the center of the field and are obtained by photographing suitable test charts comprised of patterns of parallel lines. The series of patterns of the test chart are imaged on the negative with the lines spaced in a geometric series of the fourth root of two lines to the millimeter. The row marked "tangential" gives the number of lines per millimeter in the image on the negative of the finest pattern of the test chart that is distinctly resolved into separate lines when the lines lie perpendicular to the radius drawn from the center of the field. The row marked "radial" gives similar values for the pattern of test lines lying parallel to the radius.

This report applies to the three Nitrogen lenses, numbers MB5451, UF7360, and MF8386, nominal focal length 6 inches, maximum aperture f/6.3. They were tested at maximum aperture. All measurements were made with collimated incident light using a K-3 filter, a tungsten source, and Eastman Kodak spectroscopic emulsion Type V-F on selected flat glass plates. Development was in D-19 at 68°F for three minutes with continuous agitation.

For the Director,

Francis E. Washer, Chief
Refractometry Section
Metrology Division

NBS Test No. 182055
September 1, 1964

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