

# CAMERA CALIBRATION CERTIFICATE

CAMERA TYPE : RC20  
LENS TYPE : 21/4 NAGA-F  
LENS NO. : 7171

Calibration date: 07.12.2001

SwissOptic AG, Heerbrugg

 **swissoptic**  
SwissOptic AG  
Heinrich-Wild-Strasse  
CH-9435 Heerbrugg  
Schweiz

FG 01  
*[Signature]*

Aperture: 4.0  
 Filter on goniometer: VIS (400 - 700 NM)  
 Filter on camera: --  
 Principal distance for focussing distance 900 m : 213.56

**Radial distortion (micrometers) referred to principal point of symmetry (PPS)**  
 (Positive values denote image displacement away from center)

Radius mm	Half - Sides				Mean
	1	3	2	4	
10	0.1	-0.4	0.0	-0.2	-0.1
20	0.0	-0.4	-0.1	-0.2	-0.1
30	0.0	-0.4	0.3	-0.5	-0.1
40	0.5	0.3	0.4	0.1	0.3
50	0.6	-0.2	0.5	-0.1	0.2
60	0.1	-0.5	0.7	-0.6	0.0
70	-0.3	-1.0	-0.6	-0.7	-0.6
80	-1.1	-0.5	-1.2	-0.8	-0.9
90	-0.1	-0.5	-0.9	-1.1	-0.6
100	-1.0	-0.4	-0.8	-1.1	-0.8
110	-0.8	-3.4	-0.6	-0.9	-1.4
120	-1.7	-0.2	-1.9	-0.4	-1.0
130	-0.3	0.7	0.9	1.7	0.7
140	1.0	1.1	1.0	0.7	0.9
148	1.9	1.6	2.4	1.7	1.9

**Photographic resolution (line pairs per millimeter)**

International 3-line test-chart, contrast (log) : 2.0

Aperture: 4.0  
 Filter: 450 NM  
 Film: KODAK PANATOMIC X 2412  
 Developer: KODAK HC110

Angle (deg)	0	5	10	15	20	25	30	35
Radial:	84	94	93	91	48	38	33	55
Tangential:	84	74	73	70	59	62	56	50

AWAR (Area weighted average resolution) in lp/mm: 58

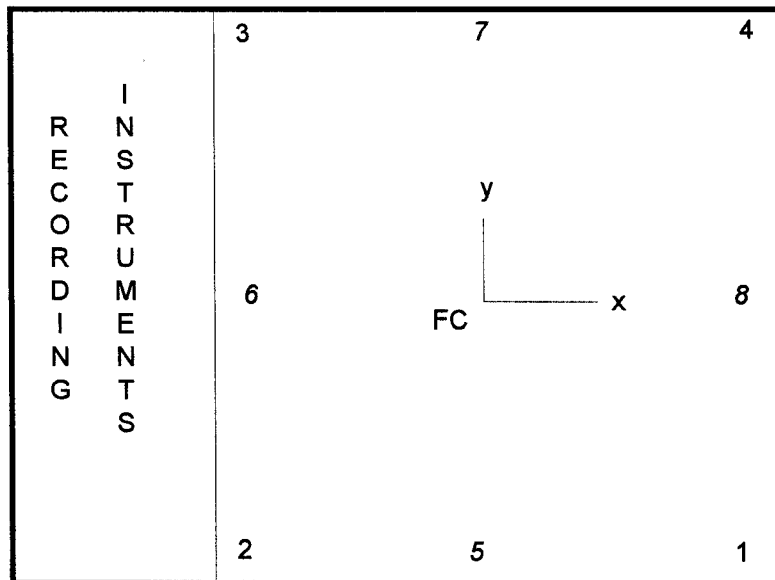
FO 017  
Hao

**Principal point of autocollimation (PPA) and principal point of symmetry (PPS) referred to central cross (FC), see diagram**

	x (mm)	y (mm)
<b>PPA</b>	0.008	-0.006
<b>PPS</b>	0.009	-0.008

**Fiducial marks, referred to central cross (FC)**

	x (mm)	y (mm)		x (mm)	y (mm)
<b>1</b>	106.005	-106.006	<b>5</b>	0.003	-109.999
<b>2</b>	-105.999	-106.001	<b>6</b>	-109.999	0.000
<b>3</b>	-105.999	106.001	<b>7</b>	0.004	110.000
<b>4</b>	106.010	106.013	<b>8</b>	110.006	0.000

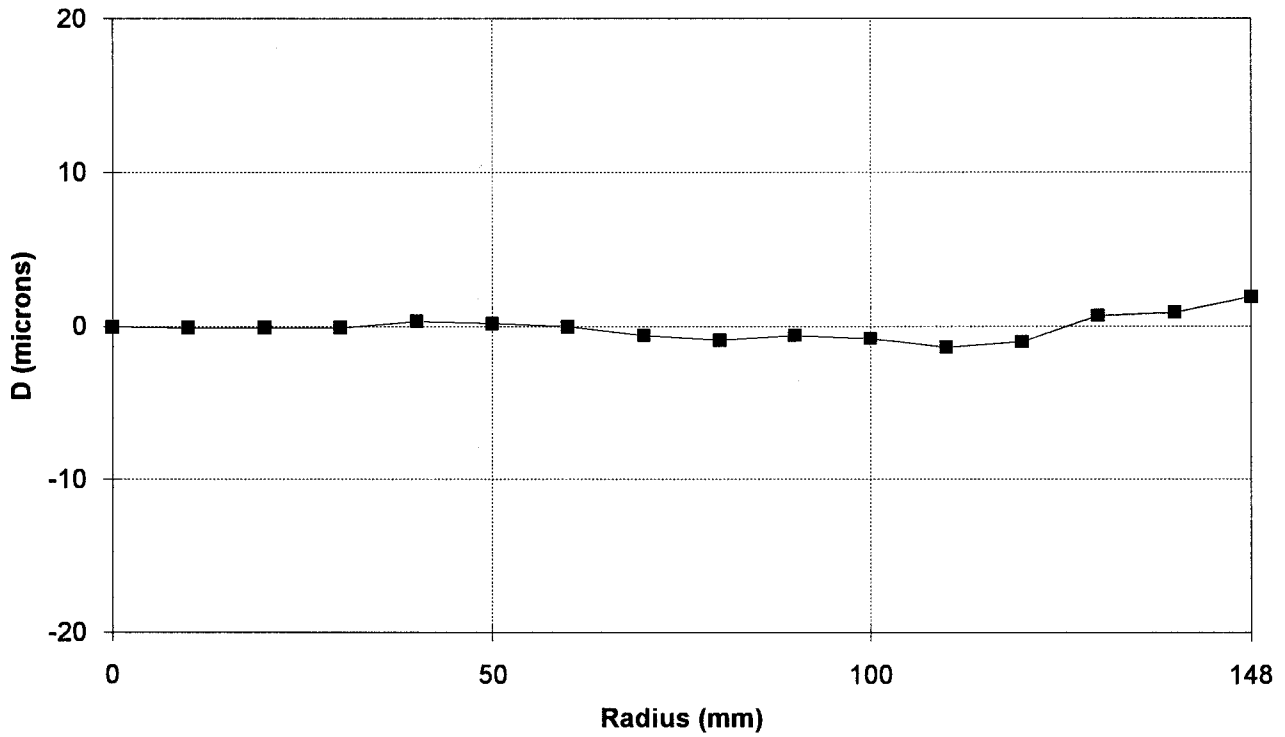


as seen on focal plane frame

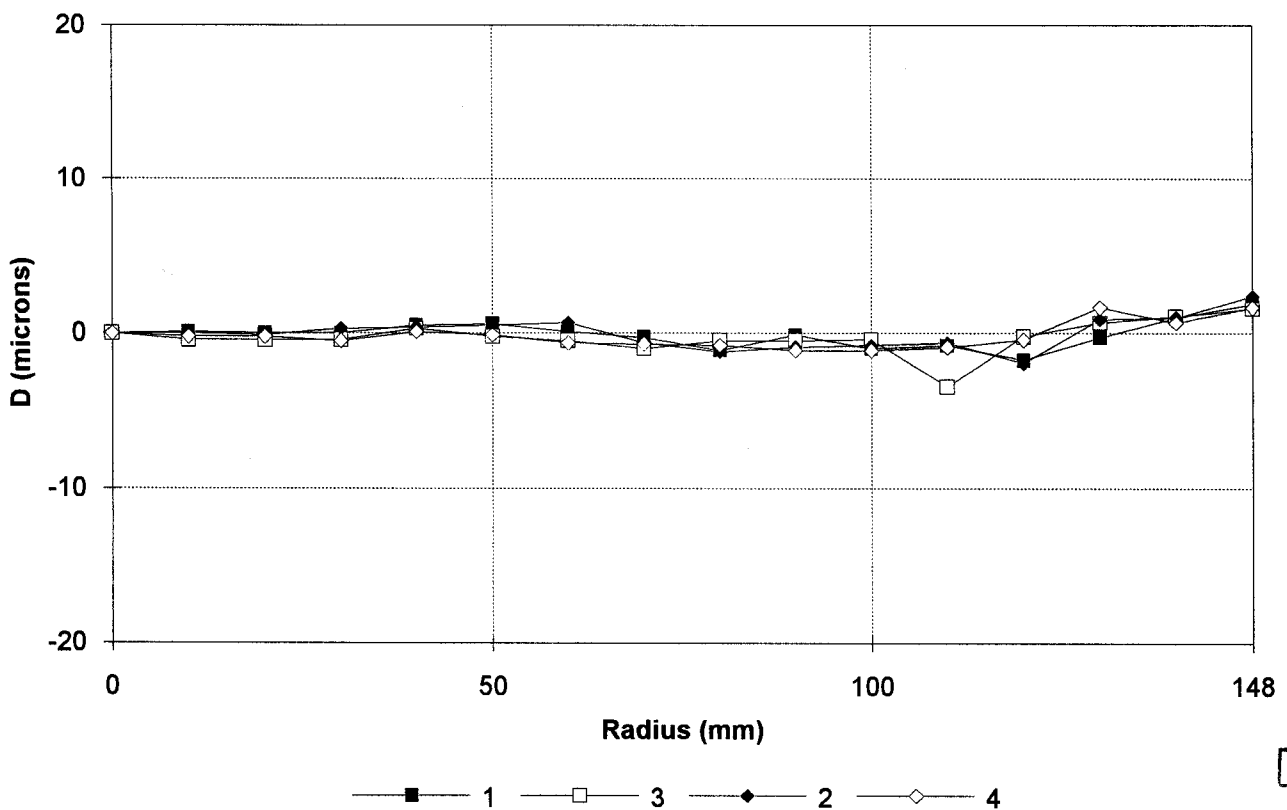
FO 017 *hao*

Aperture: 4.0  
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### Mean radial distortion



### Radial distortion for semi-diagonals referred to PPS



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