

# CAMERA CALIBRATION CERTIFICATE

CAMERA TYPE : RC20  
LENS TYPE : 15/4 UAGA-F  
LENS NO. : 13133

Calibration date: 09.02.1999

SwissOptic AG, Heerbrugg

 **swissoptic**  
SwissOptic AG  
Heinrich-Wild-Strasse  
CH-9436 Heerbrugg  
Schweiz



Aperture: 4.0  
 Filter on goniometer: VIS (400 - 700 NM)  
 Filter on camera: --  
 C.F.L. : 152.728 mm

**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	1.0	0.4	0.9	0.5	0.7
20	1.3	0.9	1.2	1.0	1.1
30	1.2	1.0	1.6	0.8	1.1
40	1.2	1.2	1.1	0.7	1.0
50	0.8	0.5	0.8	0.6	0.6
60	0.1	0.5	1.1	0.0	0.4
70	0.2	0.4	0.4	0.3	0.3
80	-0.8	0.9	0.2	0.5	0.2
90	-0.3	0.8	-0.2	0.7	0.2
100	-0.5	0.8	0.7	1.1	0.5
110	-0.6	0.2	0.7	1.4	0.4
120	-0.6	-0.6	0.1	1.0	0.0
130	-1.5	-2.0	0.4	0.4	-0.6
140	-2.1	-2.7	0.4	-0.1	-1.1
148	-1.6	-3.2	1.2	0.1	-0.8

**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	40	45
Radial:	104	104	92	64	55	53	64	76	71	52
Tangential:	104	104	64	55	52	54	49	44	43	37

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

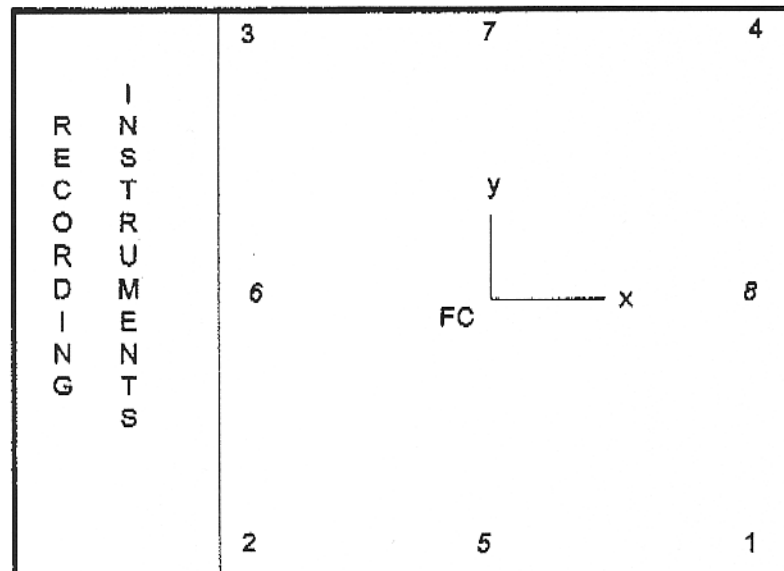
RC 137  
 12

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

	x (mm)	y (mm)
PPA	0.003	-0.005
PPS	-0.004	-0.009

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

	x (mm)	y (mm)
1	106.007	-106.007
2	-105.999	-106.000
3	-106.006	106.006
4	106.002	106.002



as seen on focal plane frame

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RC20

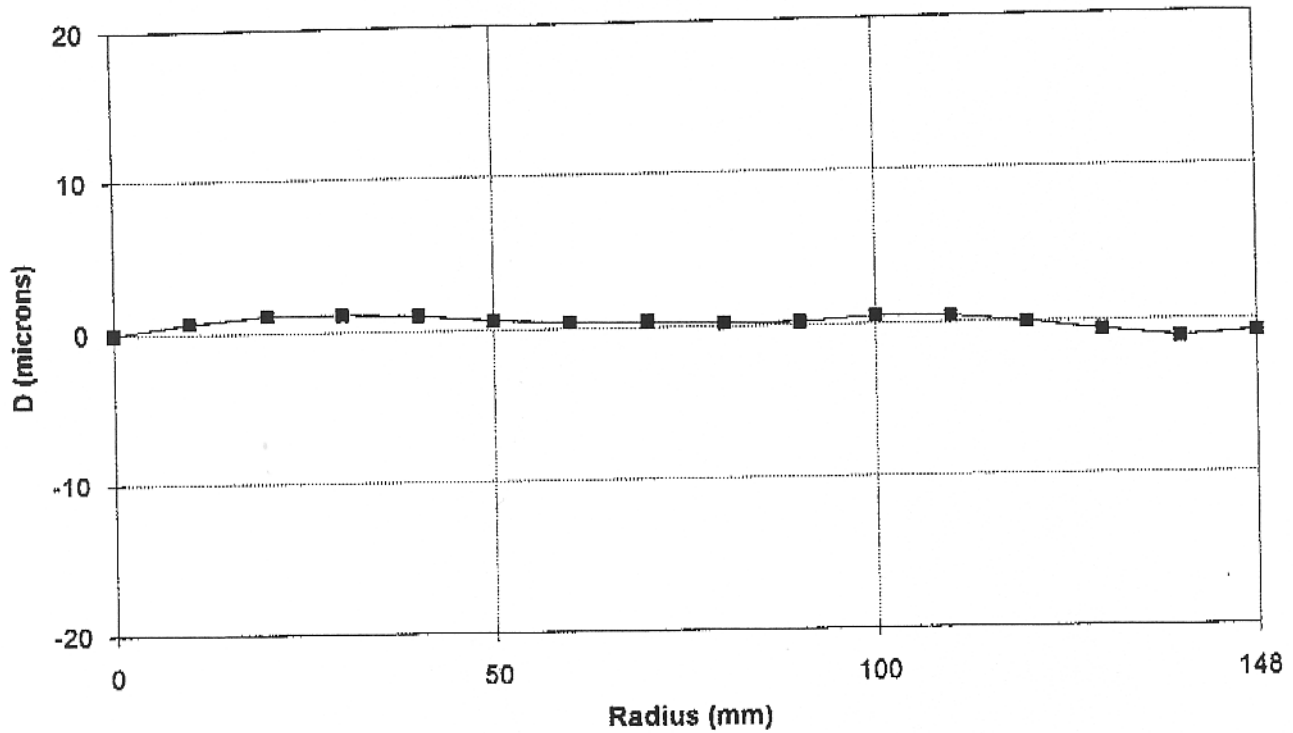
15/4 UAGA-F

No. 13133

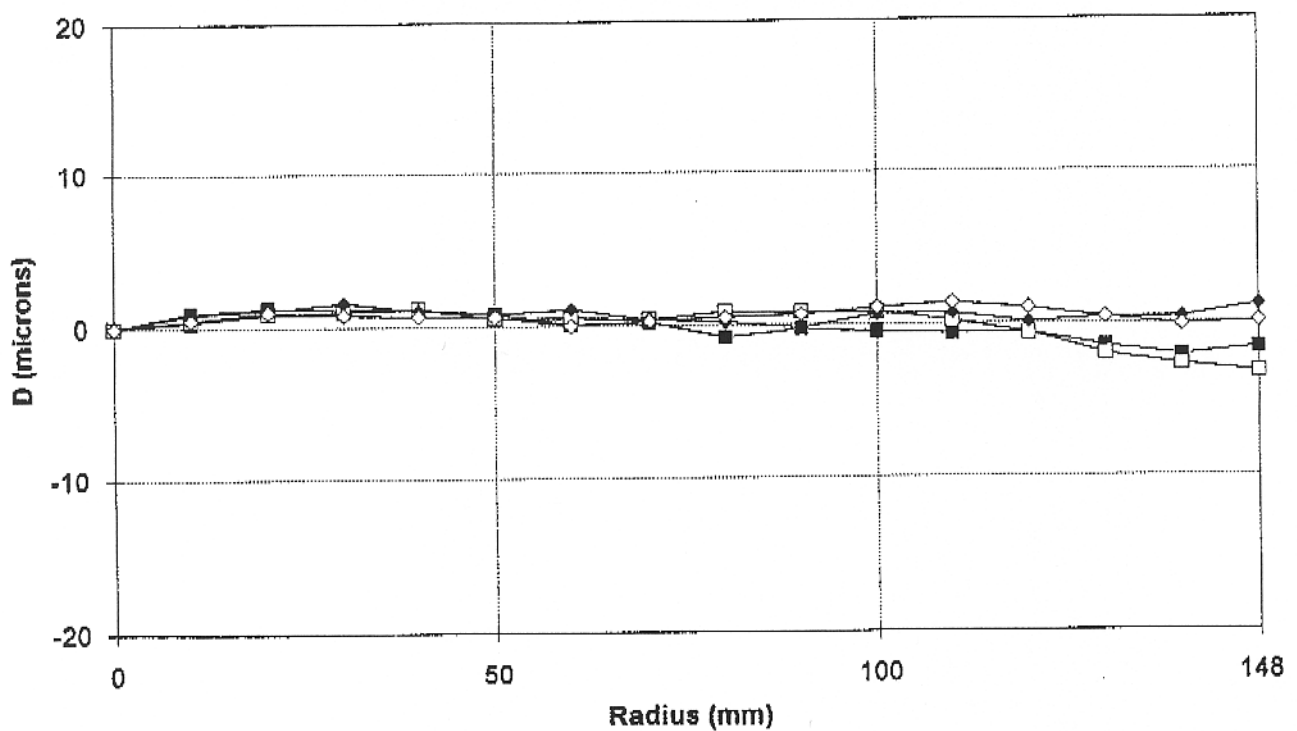
09.02.1999

Aperture: 4.0  
Filter on goniometer: VIS (400 - 700 NM)  
Filter on camera: --  
C.F.L. : 152.726 mm

### Mean radial distortion



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



—■— 1 —□— 3 —◆— 2 —◇— 4

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