

CAMERA CALIBRATION CERTIFICATE

CAMERA TYPE : RC30
LENS TYPE : 15/4 UAG-S
LENS NO. : 13426

Calibration date: 16.04.2004

LEICA AG, HEERBRUGG

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

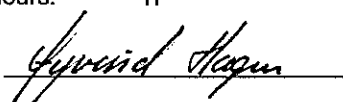


Camera Calibration Certificate

(Cover sheet)

Object	Camera Type	Lens Type	Lens-No (Serial-No)	Remarks
	RC 10			
RC 10A				
RC 20				
RC 30		15/4 UAG-S	13426	

Acceptance	Characteristics	Acceptance	Remarks
	Radial distortion	yes	
	Photographic resolution	yes	
	Principal point of autocollimation [PPA]	yes	
	Principal point of symmetry [PPS]	yes	
	Fiducial marks	yes	
	Mean radial distortion	yes	
	Radial distortion for semi-diagonals referred to PPS	yes	

Inspection			Signature / Remarks
Calibration Date	16.04.2004	Operating hours:	h
Inspector	Name: Oeyvind Hagen Position: Inspector	Signature:	
Inspection stamp-No:	FO 017		
Inspection plan	487872 14.04.1989	(Identification-No)	
Lens cone calibration process specification	870105 19.01.2000	(Identification-No)	
		(Version)	

Maintenance			Remarks
The last date, when service/ overhaul of this lens cone was performed.	.	Operating hours	h
Overhaul urgently required:		To avoid any malfunctions / damages, it is recommended to perform a complete service / overhaul as soon as possible. See „Lens calibration process specification“ or „RC 30 Technical Reference Manual“	

Aperture: 4.0
 Filter on goniometer: 450 NM
 Filter on camera: --
 C.F.L. : 153.50 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	-0.2	-1.0	-0.3	-0.8	-0.5
20	-0.8	-1.9	-0.3	-1.3	-1.0
30	-1.2	-2.5	-0.4	-2.1	-1.5
40	-1.4	-2.8	-0.5	-2.3	-1.7
50	-1.3	-3.4	-0.5	-2.4	-1.9
60	-1.7	-3.7	0.1	-2.9	-2.0
70	-0.9	-4.2	0.0	-2.9	-2.0
80	-0.7	-3.8	0.7	-2.6	-1.6
90	0.6	-3.4	1.0	-2.3	-1.0
100	0.9	-2.3	2.0	-0.9	0.0
110	1.3	-0.7	2.4	0.9	0.9
120	1.0	1.5	1.2	2.2	1.4
130	-0.1	2.8	1.0	3.2	1.7
140	-0.5	3.5	0.6	3.4	1.7
148	0.3	2.3	0.3	2.9	1.4

Photographic resolution (line pairs per millimeter)

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

Aperture: 4.0
 Filter: 450 nm
 Film: KODAK PANATOMOC X 2412
 Developer: KODAK HC110

Angle (deg)	0	5	10	15	20	25	30	35	40	45
Radial:	147	147	145	142	139	134	128	121	113	93
Tangential:	147	146	143	123	116	108	111	99	87	59

AWAR (Area weighted average resolution) in lp/mm: 116

Hao

RC30

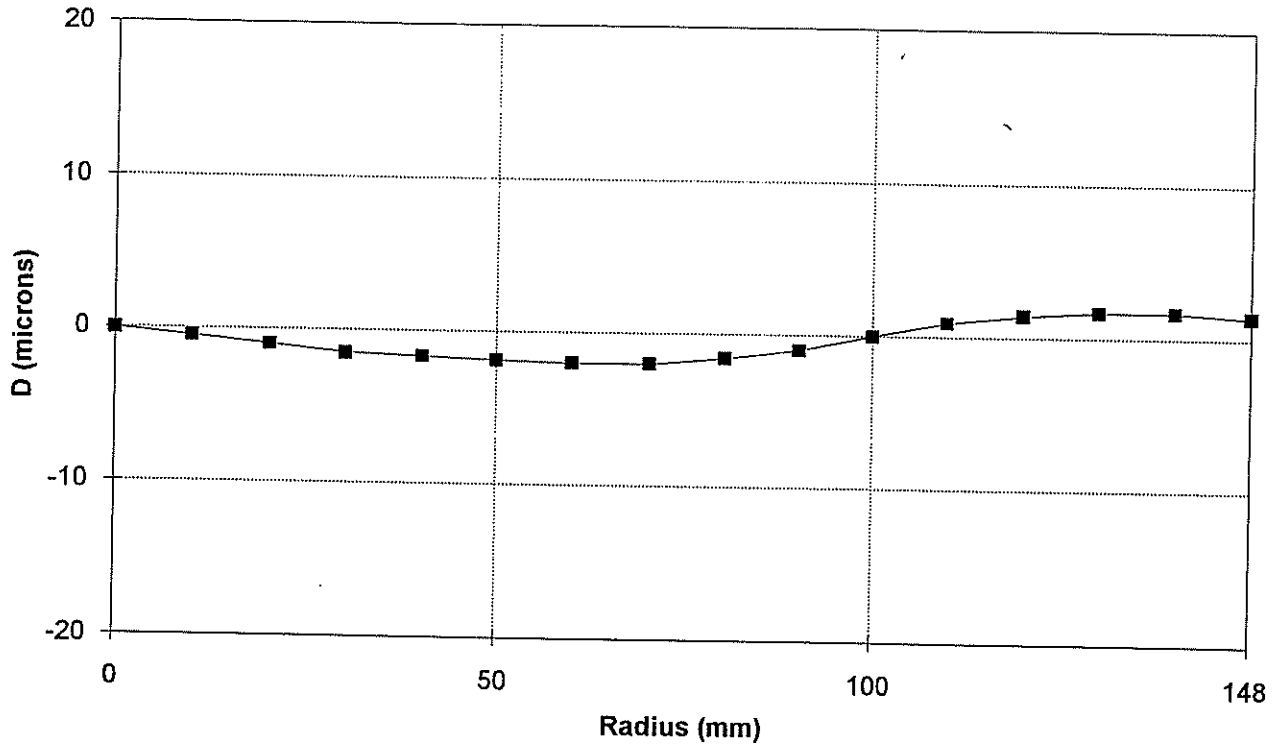
15/4 UAG-S

No. 13426

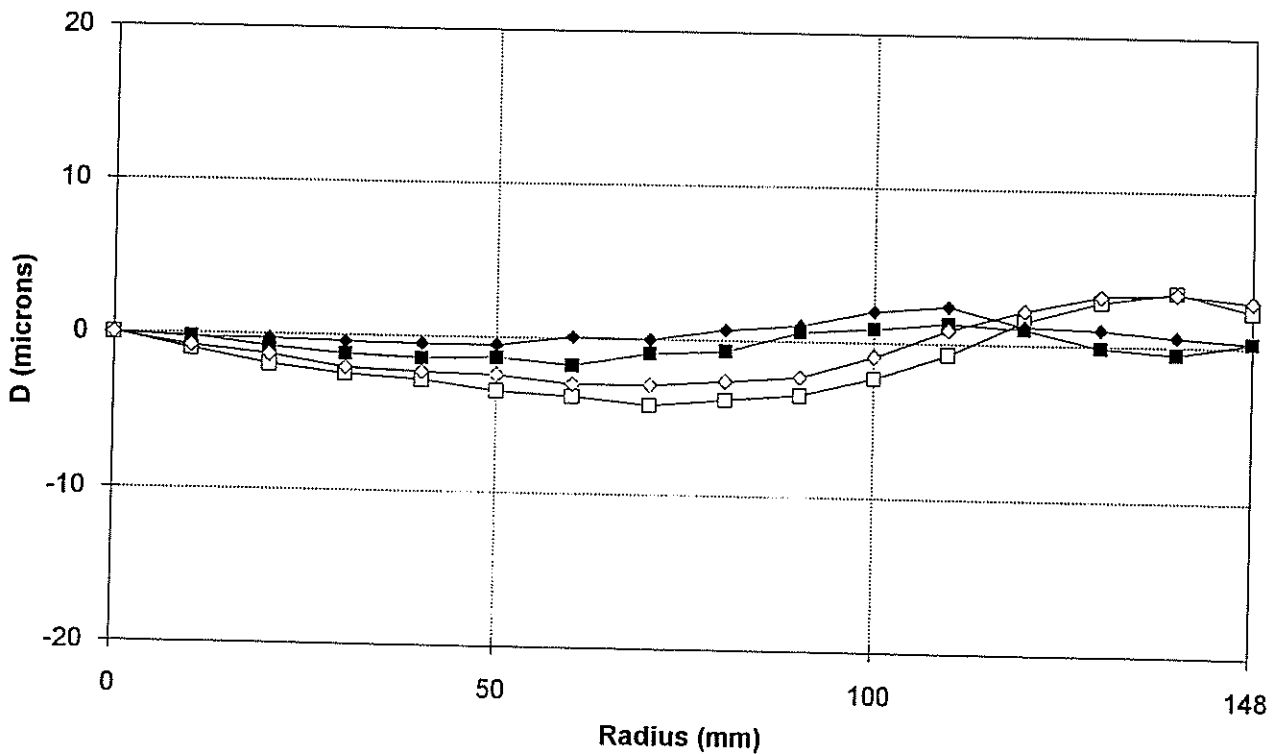
16.04.2004

Aperture: 4.0
Filter on goniometer: 450 NM
Filter on camera: --
C.F.L. : 153.50 mm

Mean radial distortion



Radial distortion for semi-diagonals referred to PPS



—■— 1 —□— 3 —◆— 2 —◇— 4

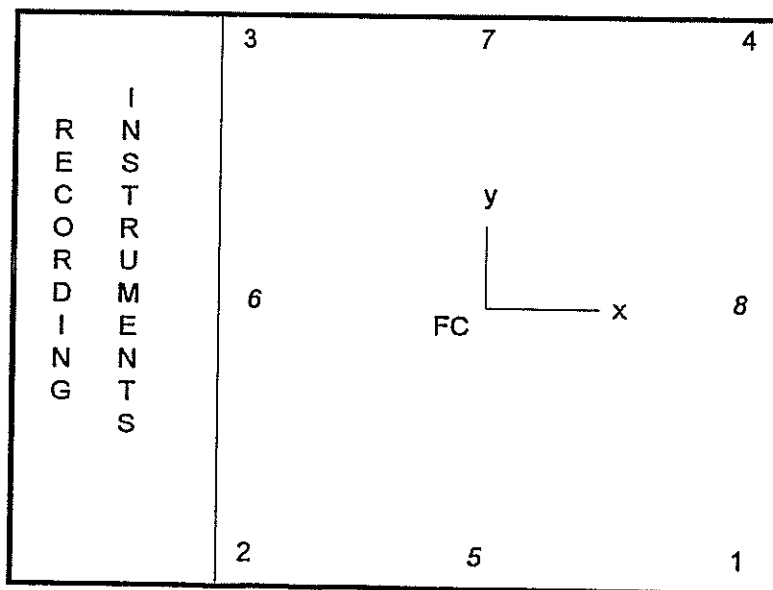
Handwritten signature

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	-0.006
PPS	-0.006	-0.004

Fiducial marks, referred to central cross (FC)

	x (mm)	y (mm)		x (mm)	y (mm)
1	106.001	-106.001	5	0.000	-112.002
2	-106.000	-106.000	6	-111.999	0.002
3	-106.000	106.000	7	-0.001	112.001
4	105.998	105.999	8	111.995	-0.001



as seen on focal plane frame

Hao