

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	13355	

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	22.12.2004	Operating hours:
Inspector	Name: Paul Dietsche	Signature:	<i>Gywid Hagen</i>
	Position: Inspector		
	Inspection stamp-No: FO 017		
Inspection plan	487872	(Identification-No)	
	14.04.1989	(Version)	
Lens cone calibration process specification	870105	(Identification-No)	
	19.01.2000	(Version)	

Maintenance			Remarks
	The last date, when service/ overhaul of this lens cone was performed.	22.12.2004	Operating hours
Overhaul urgently required:	no	To avoid any malfunctions / damages, it is recommended to perform a complete service / overhaul as soon as possible. See „Lens calibration process specification“ or „ Technical Reference Manual“	

CAMERA CALIBRATION CERTIFICATE

CAMERA TYPE : RC30
LENS TYPE : 15/4 UAG-S
LENS NO. : 13355

Calibration date: 22.12.2004

LEICA AG, HEERBRUGG

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

Hoo

Aperture: 4.0
 Filter on goniometer: VIS (400-700 NM)
 Filter on camera: --
 C.F.L. : 153.54 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	0.1	-0.7	-0.1	-0.4	-0.2
20	-0.3	-1.1	-0.3	-0.5	-0.5
30	-0.9	-1.6	-0.4	-1.0	-0.9
40	-1.4	-1.4	-0.6	-0.6	-1.0
50	-1.7	-1.8	-1.0	-0.5	-1.2
60	-2.4	-2.0	-1.1	-0.9	-1.6
70	-2.4	-2.1	-1.5	-0.5	-1.6
80	-2.9	-1.7	-1.3	0.0	-1.4
90	-1.9	-1.8	-1.2	0.5	-1.1
100	-1.6	-1.8	0.5	1.3	-0.4
110	-1.0	-1.6	2.0	2.7	0.5
120	-0.1	-1.5	2.9	2.9	1.0
130	-0.7	-1.5	3.3	2.0	0.7
140	-2.0	-1.1	2.9	1.4	0.3
148	-2.3	-1.6	1.5	1.3	-0.2

Photographic resolution (line pairs per millimeter)

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

Aperture: 4.0
 Filter: VIS (400-700 NM)
 Film: KODAK PANATOMIC 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	83
Tangential:	147	146	143	123	116	96	88	88	77	59

AWAR (Area weighted average resolution) in lp/mm: 110

13355
Hao

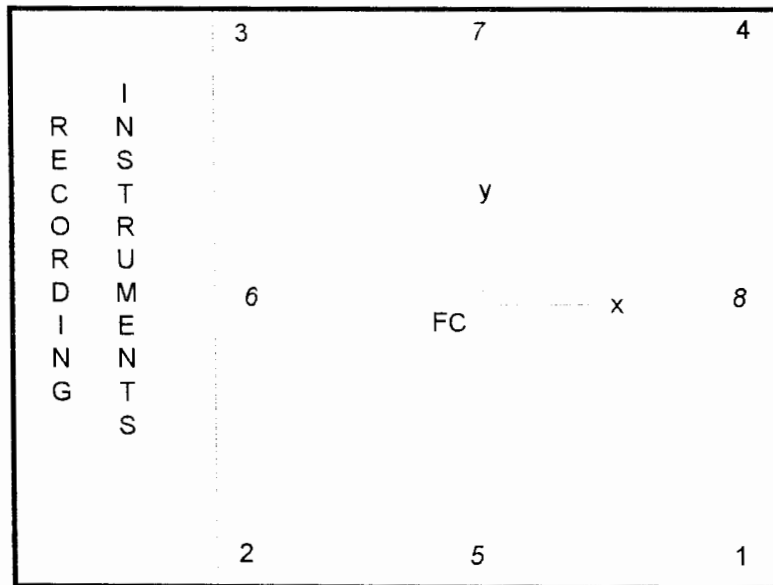
**Principal point of autocollimation (PPA) and
principal point of symmetry (PPS)**

referred to central cross (FC), see diagram

	x (mm)	y (mm)
PPA	-0.008	0.009
PPS	-0.004	0.002

Fiducial marks, referred to central cross (FC)

	x (mm)	y (mm)		x (mm)	y (mm)
1	106.001	-106.000	5	-0.001	-112.000
2	-105.999	-106.000	6	-111.999	-0.001
3	-106.000	105.999	7	0.001	111.999
4	106.006	106.006	8	111.995	-0.001

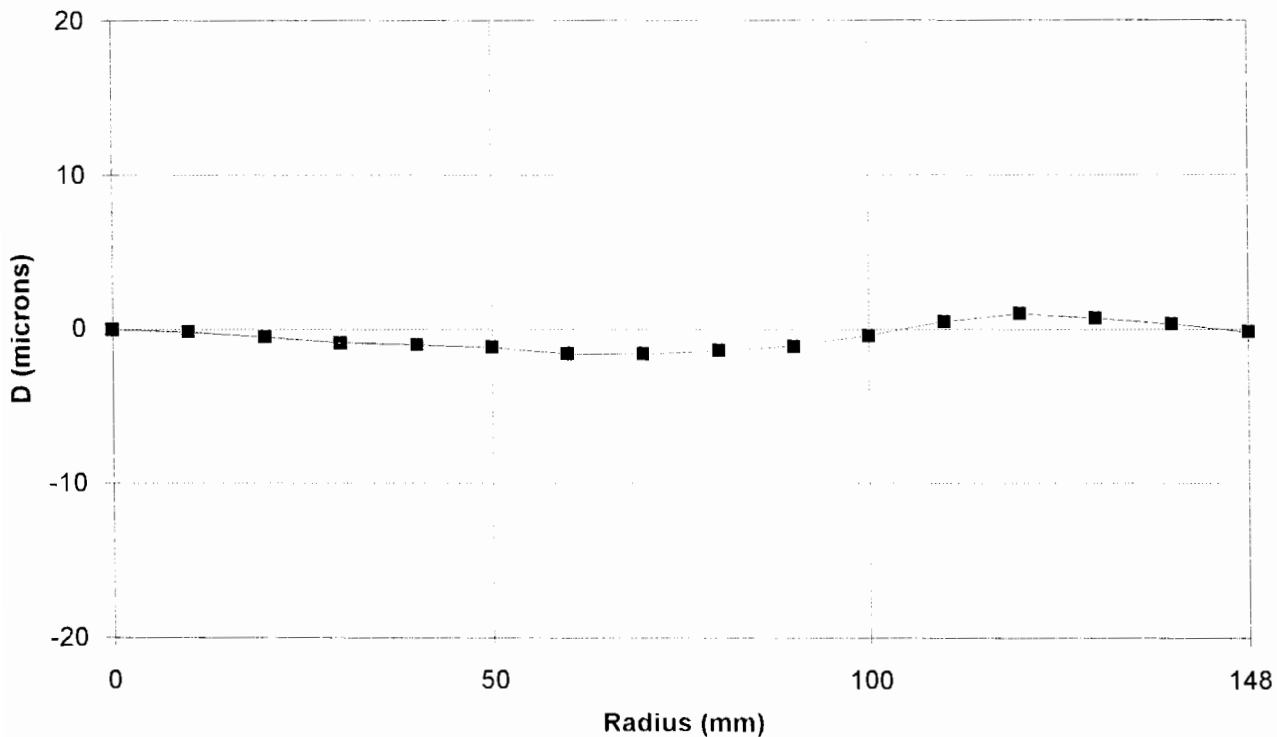


as seen on focal plane frame

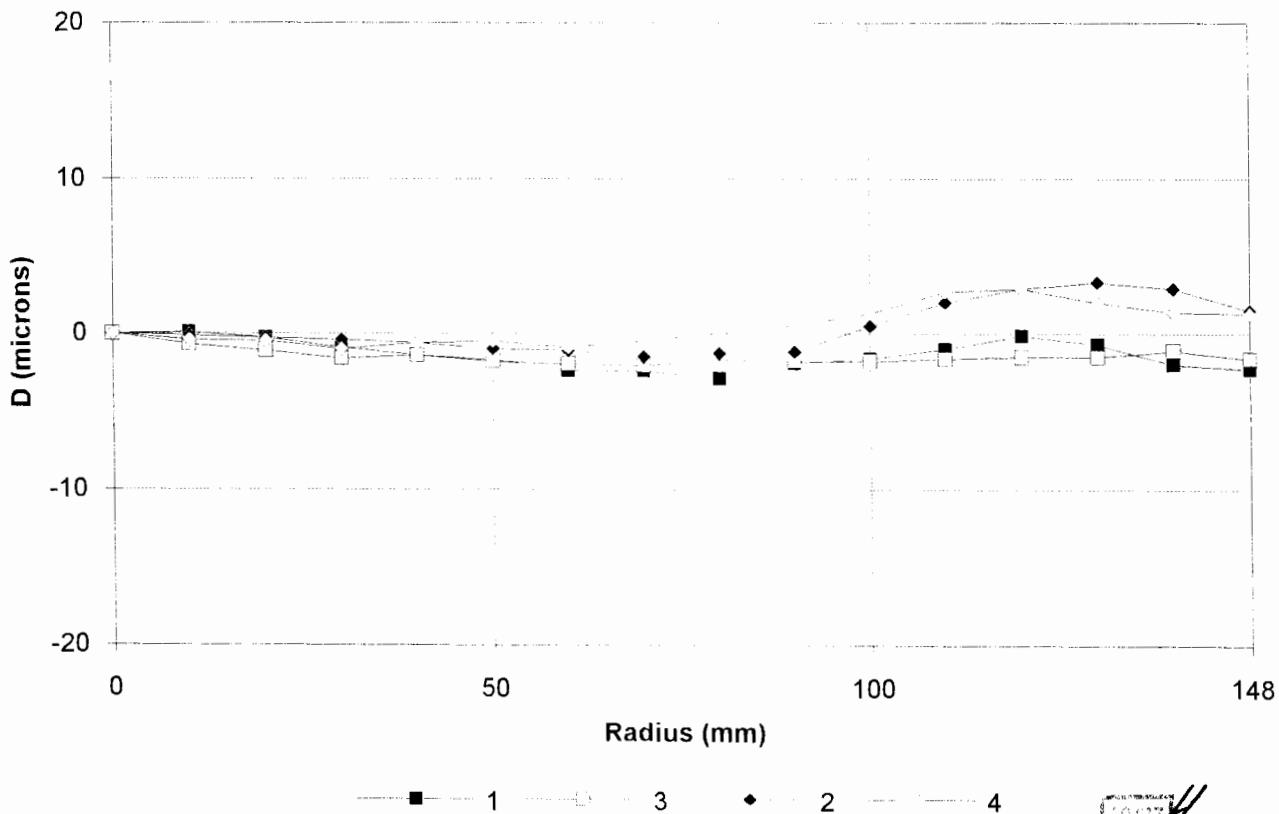
Hoo

Aperture: 4.0
Filter on goniometer: VIS (400-700 NM)
Filter on camera: --
C.F.L. : 153.54 mm

Mean radial distortion



Radial distortion for semi-diagonals referred to PPS



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