

CAMERA CALIBRATION CERTIFICATE

CAMERA TYPE : RC30
LENS TYPE : 15/4 UAG-S
LENS NO. : 13215

Calibration date: 02.10.2001

SwissOptic AG, Heerbrugg

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



Aperture: 4.0
 Filter on goniometer: VIS (400 - 700 NM)
 Filter on camera: --
 C.F.L. : 152.858 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 | -0.5 | -0.1 | 0.0 | -0.1 |
| 20 | -0.2 | -0.6 | -0.2 | -0.1 | -0.2 |
| 30 | -0.3 | -0.8 | 0.1 | -0.5 | -0.3 |
| 40 | -0.7 | -0.8 | -0.5 | -0.5 | -0.6 |
| 50 | -0.9 | -1.3 | -0.6 | -0.5 | -0.8 |
| 60 | -1.5 | -1.4 | -0.3 | -0.6 | -0.9 |
| 70 | -0.7 | -1.7 | -0.3 | -0.4 | -0.7 |
| 80 | -0.8 | -0.5 | -0.4 | 0.3 | -0.3 |
| 90 | 0.6 | 0.1 | -0.1 | 0.9 | 0.3 |
| 100 | 1.1 | 0.9 | 1.1 | 1.3 | 1.1 |
| 110 | 2.2 | 1.3 | 1.5 | 1.7 | 1.6 |
| 120 | 2.7 | 2.0 | 0.6 | 1.2 | 1.6 |
| 130 | 1.9 | 1.7 | -0.5 | -0.2 | 0.7 |
| 140 | 0.2 | 1.2 | -2.3 | -2.8 | -0.9 |
| 148 | -0.3 | 0.8 | -3.5 | -4.6 | -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 | 40 | 45 |
|-------------|-----|-----|-----|-----|----|-----|----|----|-----|----|
| Radial: | 104 | 131 | 115 | 113 | 78 | 106 | 90 | 86 | 101 | 74 |
| Tangential: | 117 | 116 | 114 | 97 | 92 | 76 | 78 | 79 | 69 | 59 |

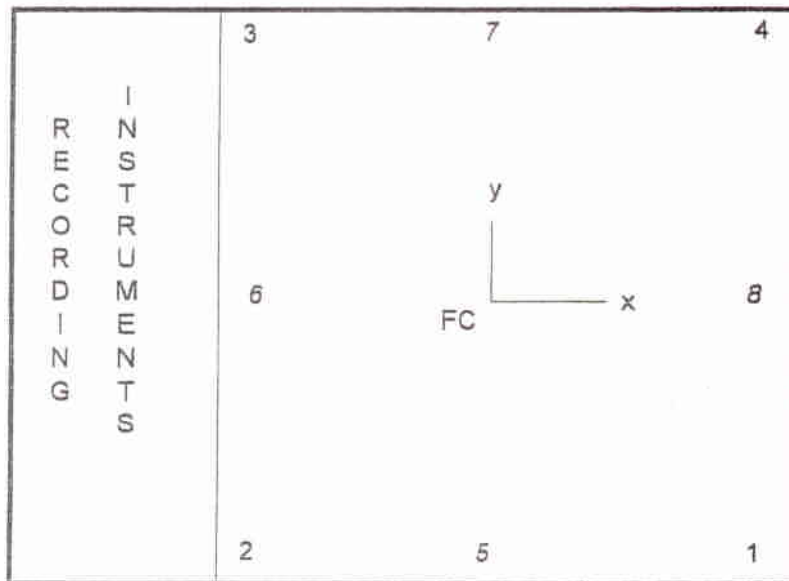
AWAR (Area weighted average resolution) in lp/mm: 88

**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 | 0.006 | 0.001 |

Fiducial marks, referred to central cross (FC)

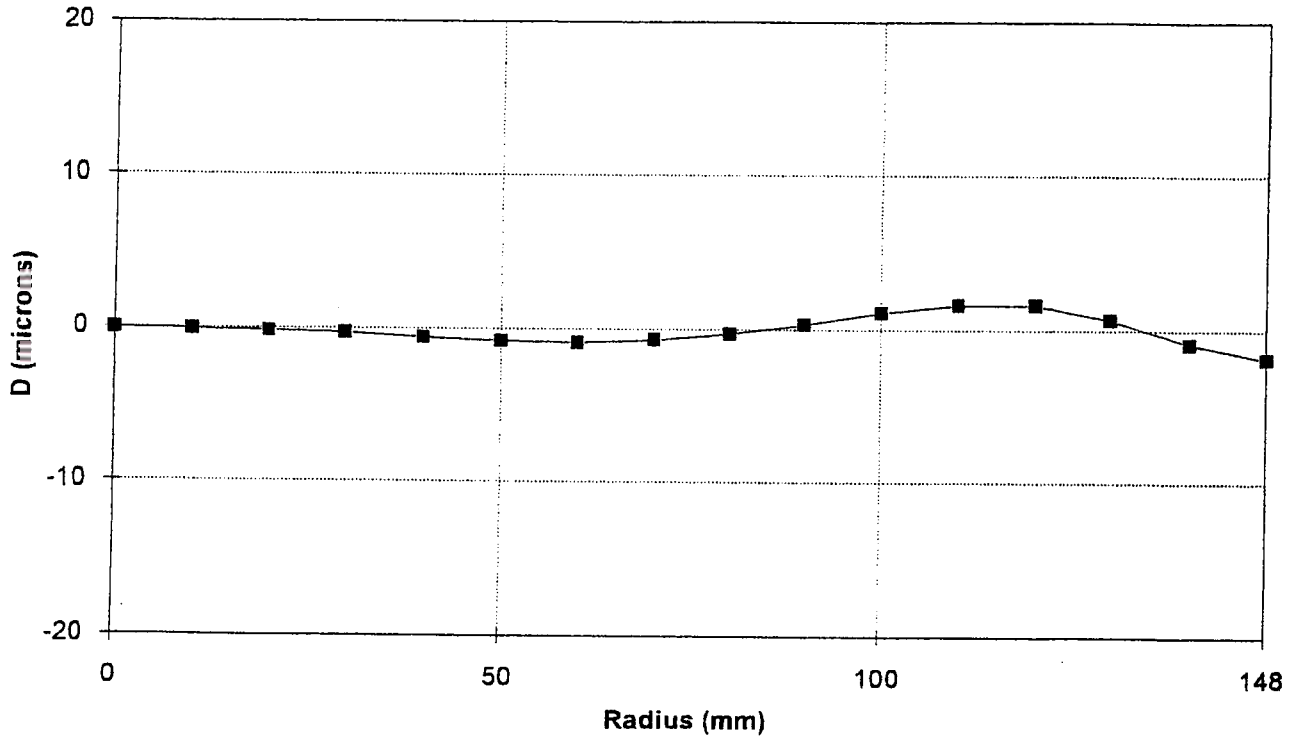
| | x (mm) | y (mm) | | x (mm) | y (mm) |
|----------|----------|----------|----------|----------|----------|
| 1 | 106.004 | -106.003 | 5 | 0.003 | -110.000 |
| 2 | -106.002 | -105.999 | 6 | -110.001 | 0.000 |
| 3 | -106.003 | 106.002 | 7 | -0.001 | 110.000 |
| 4 | 106.003 | 106.001 | 8 | 110.003 | 0.001 |



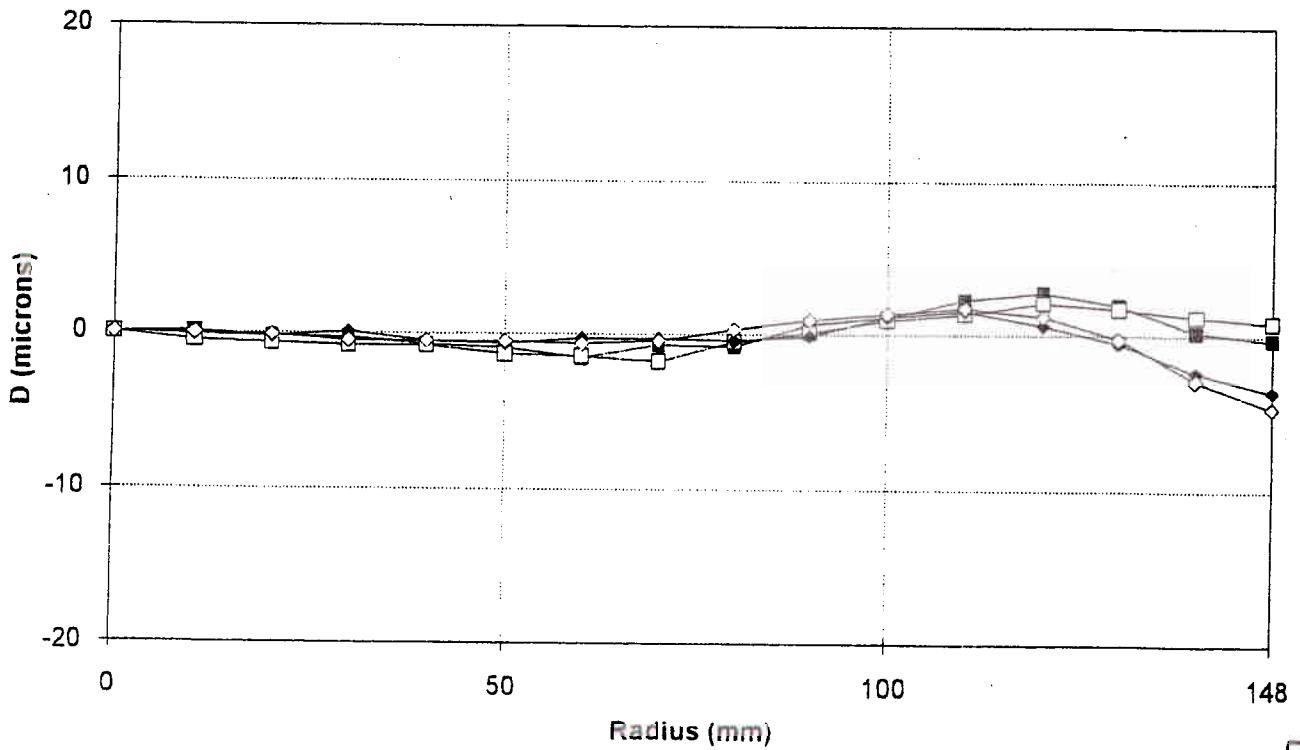
as seen on focal plane frame

Aperture: 4.0
Filter on goniometer: VIS (400 - 700 NM)
Filter on camera: --
C.F.L. : 152.858 mm

Mean radial distortion



Radial distortion for semi-diagonals referred to PPS



—■— 1 —□— 3 —◆— 2 —◇— 4

FG 012
1100