

# CAMERA CALIBRATION CERTIFICATE

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

Calibration date: 28.09.1998

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. : 152.857 mm

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

| Radius<br>mm | Half - Sides |      |      |      | Mean |
|--------------|--------------|------|------|------|------|
|              | 1            | 3    | 2    | 4    |      |
| 10           | 0.3          | -0.4 | 0.1  | 0.1  | 0.0  |
| 20           | -0.1         | -0.9 | 0.1  | -0.1 | -0.2 |
| 30           | -0.5         | -1.0 | 0.3  | -0.5 | -0.4 |
| 40           | -0.5         | -1.2 | -0.1 | -0.5 | -0.5 |
| 50           | -0.6         | -1.8 | -0.2 | -0.5 | -0.7 |
| 60           | -1.4         | -1.8 | 0.4  | -0.9 | -0.9 |
| 70           | -0.7         | -2.0 | 0.1  | -0.3 | -0.7 |
| 80           | -0.6         | -0.7 | 0.5  | 0.9  | 0.0  |
| 90           | 0.7          | 0.4  | 0.9  | 1.7  | 0.9  |
| 100          | 1.2          | 0.8  | 1.6  | 2.2  | 1.4  |
| 110          | 1.9          | 1.3  | 2.2  | 2.7  | 2.0  |
| 120          | 2.2          | 1.6  | 1.1  | 1.8  | 1.6  |
| 130          | 1.0          | 1.0  | 0.2  | 0.2  | 0.6  |
| 140          | -1.1         | 0.2  | -2.2 | -2.7 | -1.4 |
| 148          | -1.3         | -0.4 | -3.6 | -4.4 | -2.4 |

**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 | 117 | 115 | 90  | 78 | 81 | 90 | 121 | 101 | 83 |
| Tangential: | 104 | 116 | 114 | 109 | 92 | 86 | 70 | 79  | 77  | 59 |

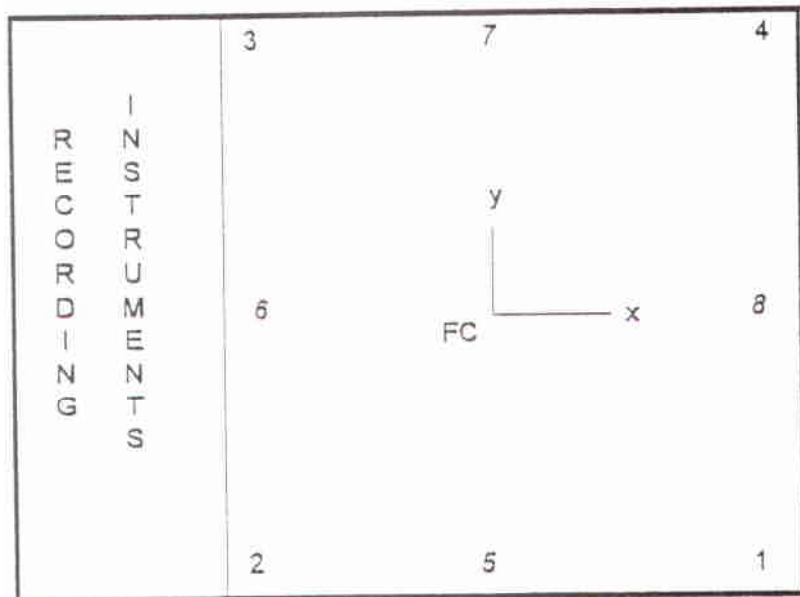
AWAR (Area weighted average resolution) in lp/mm: 90

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 | 0.007  | 0.003  |

Fiducial marks, referred to central cross (FC)

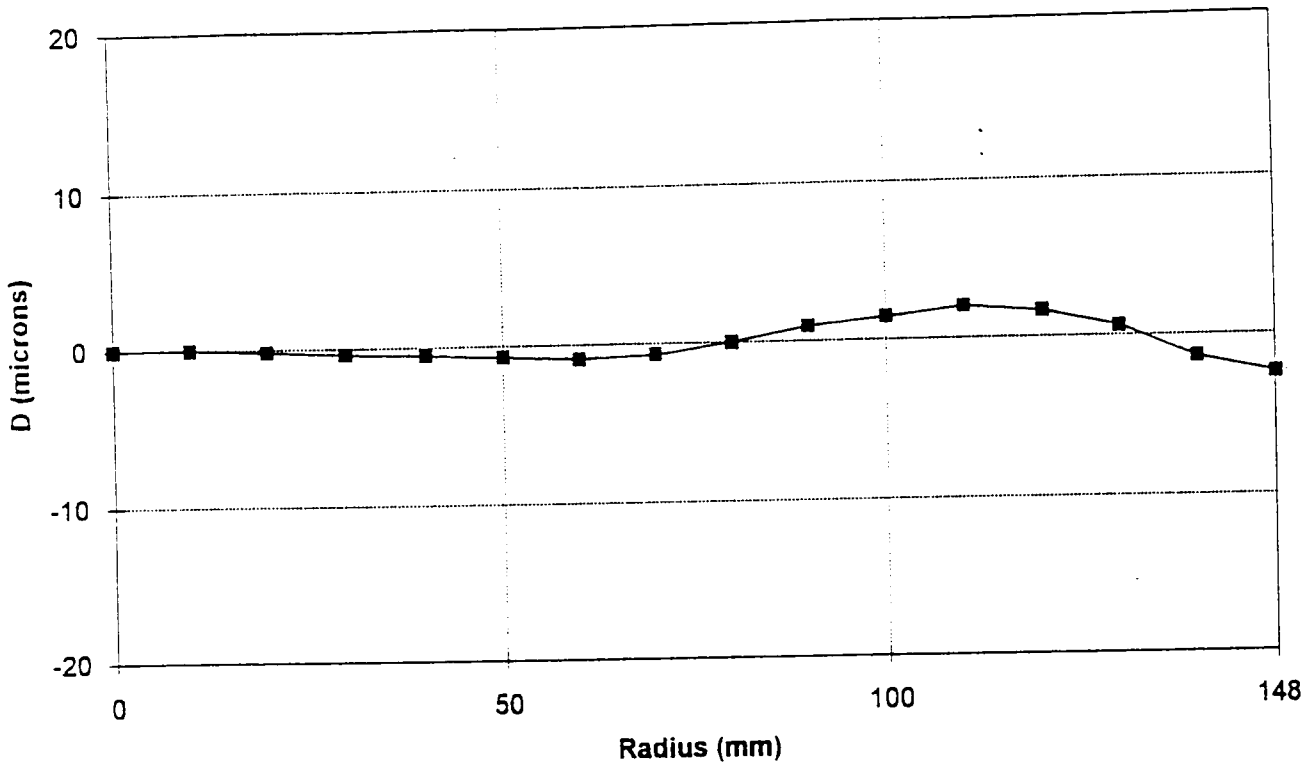
|   | x (mm)   | y (mm)   |   | x (mm)   | y (mm)   |
|---|----------|----------|---|----------|----------|
| 1 | 106.004  | -106.001 | 5 | 0.001    | -109.994 |
| 2 | -106.005 | -108.002 | 6 | -110.004 | -0.002   |
| 3 | -106.003 | 106.000  | 7 | 0.003    | 109.991  |
| 4 | 106.007  | 106.004  | 8 | 110.001  | 0.001    |



as seen on focal plane frame

Aperture: 4.0  
Filter on goniometer: VIS (400 - 700 NM)  
Filter on camera: -  
C.F.L.: 152.857 mm

### Mean radial distortion



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

