


CAMERA CALIBRATION CERTIFICATE

CAMERA TYPE : RC30
LENS TYPE : 15/4 UAG-S
LENS NO. : 13242

Calibration date: 13.04.2004

LEICA AG, HEERBRUGG

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



Aperture: 4.0
 Filter on goniometer: 450 NM
 Filter on camera: --
 C.F.L. : 152.81 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 | -0.6 | -0.3 |
| 20 | -0.4 | -1.0 | -0.3 | -0.5 | -0.5 |
| 30 | -0.7 | -1.0 | 0.1 | -0.9 | -0.6 |
| 40 | -0.8 | -0.6 | 0.0 | -0.3 | -0.4 |
| 50 | -0.4 | -0.4 | 0.5 | 0.2 | 0.0 |
| 60 | -0.7 | -0.1 | 1.4 | 0.4 | 0.2 |
| 70 | 0.2 | 0.3 | 1.5 | 0.9 | 0.7 |
| 80 | 0.1 | 0.5 | 1.9 | 1.1 | 0.9 |
| 90 | 1.1 | 0.4 | 1.8 | 0.7 | 1.0 |
| 100 | 1.1 | 0.3 | 2.8 | 1.0 | 1.3 |
| 110 | 1.2 | 0.2 | 2.8 | 1.2 | 1.3 |
| 120 | 1.2 | -0.2 | 1.5 | 0.3 | 0.7 |
| 130 | 0.1 | -0.9 | 0.8 | 0.0 | 0.0 |
| 140 | -2.4 | -1.4 | -2.5 | -0.6 | -1.7 |
| 148 | -4.8 | -2.6 | -3.7 | -0.3 | -2.8 |

Photographic resolution (line pairs per millimeter)

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

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 Film: KODAK PANATOMIC X 2412
 Developer: KODAK HC110

| Angle (deg) | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
|-------------|-----|-----|-----|-----|----|-----|-----|-----|----|----|
| Radial: | 131 | 117 | 103 | 101 | 87 | 106 | 128 | 121 | 90 | 83 |
| Tangential: | 131 | 116 | 114 | 97 | 92 | 108 | 111 | 99 | 77 | 47 |

AWAR (Area weighted average resolution) in lp/mm: 103

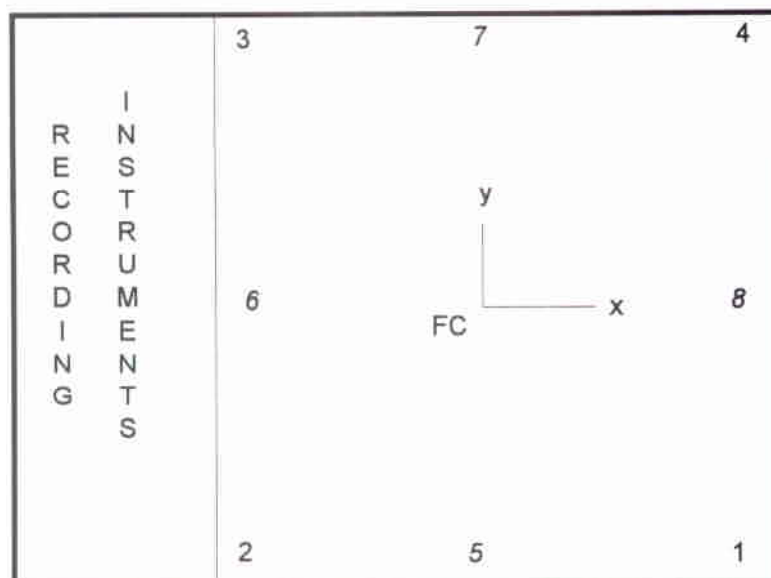


Principal point of autocollimation (PPA) and principal point of symmetry (PPS) referred to central cross (FC), see diagram

| | x (mm) | y (mm) |
|------------|--------|--------|
| PPA | 0.008 | 0.008 |
| PPS | 0.001 | 0.005 |

Fiducial marks, referred to central cross (FC)

| | x (mm) | y (mm) | | x (mm) | y (mm) |
|----------|----------|----------|----------|----------|----------|
| 1 | 105.999 | -105.996 | 5 | -0.004 | -111.999 |
| 2 | -106.004 | -106.003 | 6 | -112.004 | -0.002 |
| 3 | -106.002 | 105.998 | 7 | 0.002 | 111.995 |
| 4 | 106.002 | 106.000 | 8 | 112.001 | 0.000 |

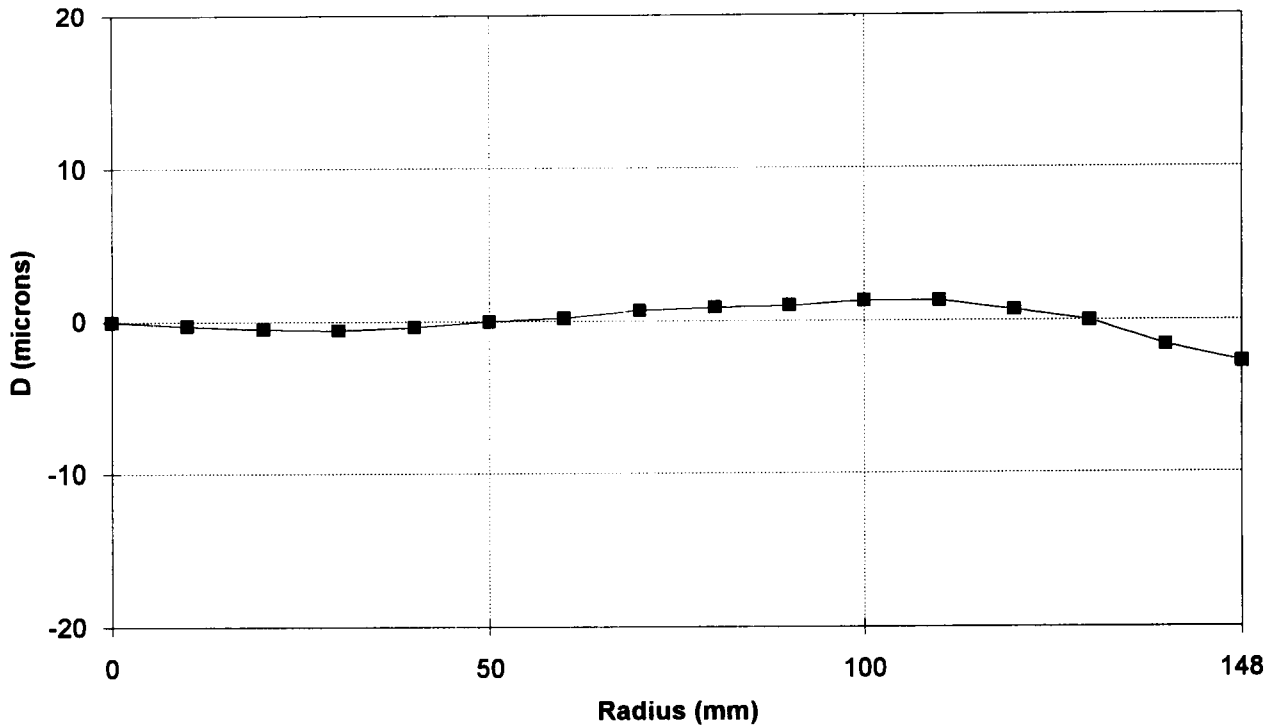


as seen on focal plane frame



Aperture: 4.0
Filter on goniometer: 450 NM
Filter on camera: --
C.F.L. : 152.81 mm

Mean radial distortion



Radial distortion for semi-diagonals referred to PPS

