

CAMERA CALIBRATION CERTIFICATE

CAMERA TYPE : RC30
LENS TYPE : 15/4 UAG-S
LENS NO. : 13301

Calibration date: 20.11.1996

LEICA AG, HEERBRUGG

Leica

*Leica Heerbrugg Ltd
CH-9435 Heerbrugg*

*Calibration Department
Supervisor*

FO 133

Aperture: 4.0
 Filter on goniometer: VIS (400 - 700 NM)
 Filter on camera: --
 C.F.L. : 153.51 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 | -0.6 | -1.2 | -0.5 | -0.5 | -0.7 |
| 20 | -1.2 | -2.2 | -1.0 | -1.3 | -1.4 |
| 30 | -1.7 | -2.6 | -1.0 | -1.9 | -1.8 |
| 40 | -1.7 | -2.4 | -1.1 | -1.4 | -1.6 |
| 50 | -1.4 | -2.5 | -0.8 | -0.8 | -1.3 |
| 60 | -1.8 | -2.2 | 0.1 | -0.5 | -1.1 |
| 70 | -0.5 | -1.9 | 0.0 | 0.0 | -0.6 |
| 80 | -0.4 | -1.1 | 0.9 | 0.9 | 0.0 |
| 90 | 1.1 | -0.7 | 1.4 | 1.4 | 0.8 |
| 100 | 1.1 | -0.4 | 2.6 | 2.0 | 1.3 |
| 110 | 1.0 | 0.4 | 3.7 | 3.0 | 2.0 |
| 120 | 0.5 | 0.1 | 2.4 | 1.2 | 1.0 |
| 130 | -0.2 | -0.7 | 1.2 | 1.1 | 0.3 |
| 140 | -1.9 | -0.5 | -0.2 | 0.7 | -0.4 |
| 148 | -3.3 | -0.5 | -1.0 | 0.1 | -1.1 |

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: | 117 | 117 | 115 | 101 | 98 | 119 | 114 | 108 | 90 | 83 |
| Tangential: | 117 | 116 | 114 | 109 | 103 | 108 | 111 | 111 | 87 | 52 |

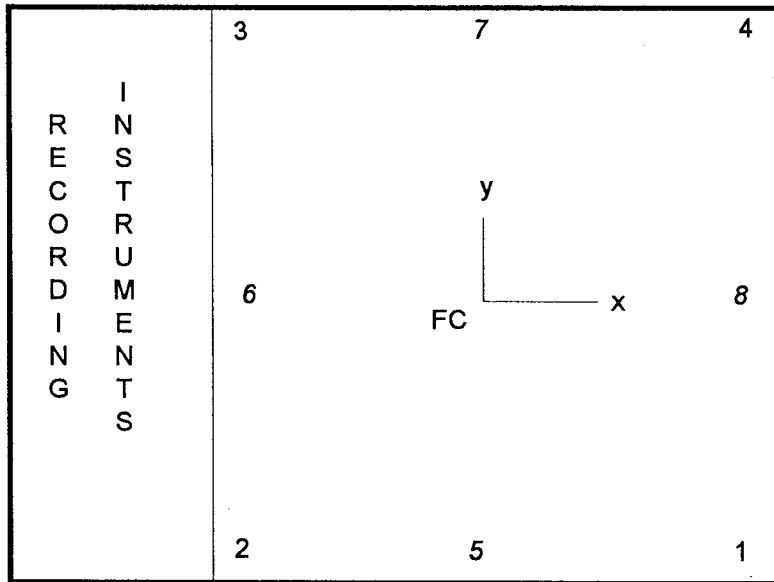
AWAR (Area weighted average resolution) in lp/mm: 106

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 | 0.013 |
| PPS | 0.007 | 0.004 |

Fiducial marks, referred to central cross (FC)

| | x (mm) | y (mm) | | x (mm) | y (mm) |
|---|----------|----------|---|----------|----------|
| 1 | 105.999 | -105.997 | 5 | 0.001 | -111.991 |
| 2 | -106.002 | -106.001 | 6 | -112.000 | 0.003 |
| 3 | -106.000 | 105.998 | 7 | 0.002 | 111.989 |
| 4 | 105.999 | 105.999 | 8 | 112.003 | 0.000 |

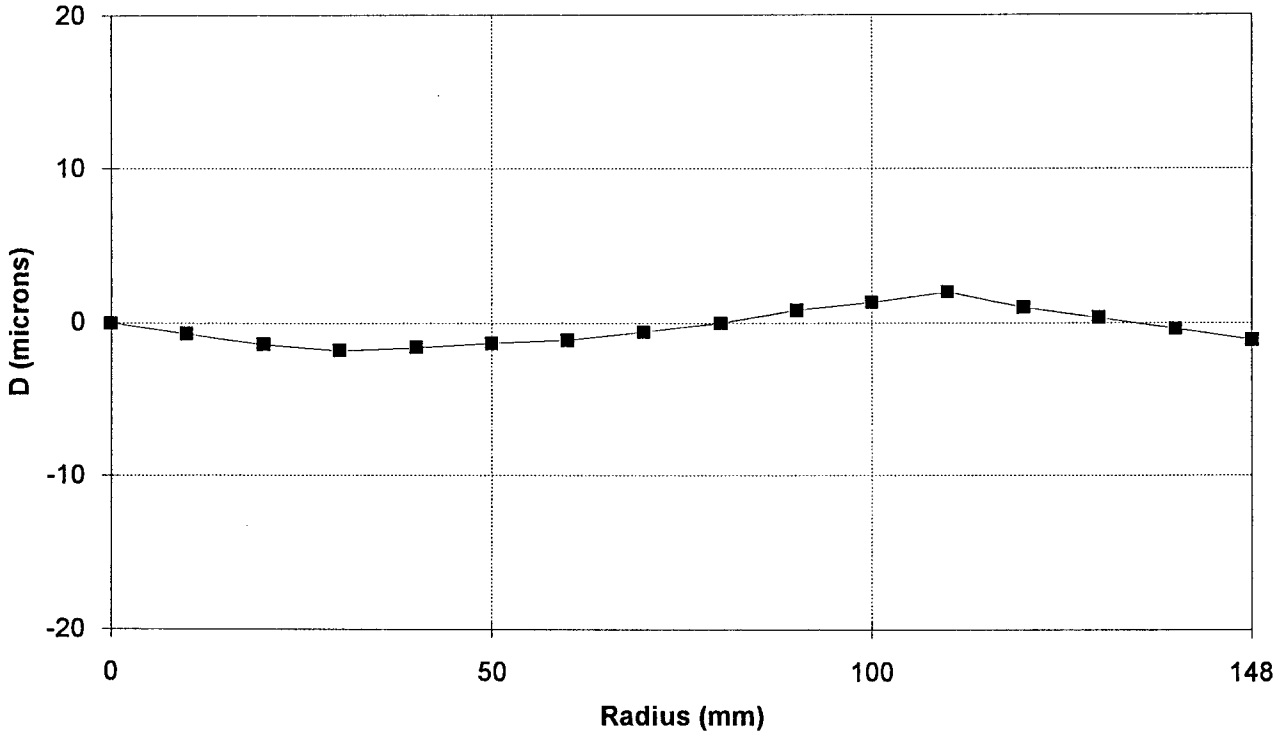


as seen on focal plane frame

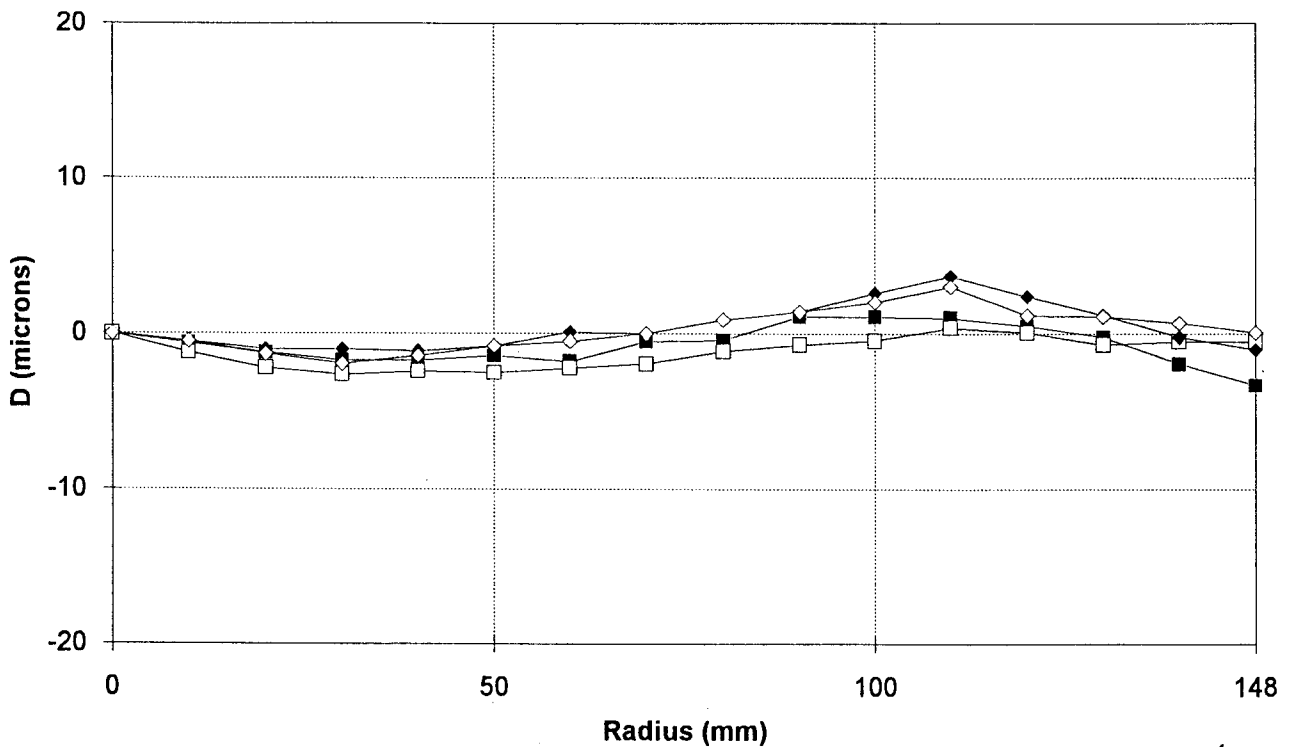
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C.F.L. : 153.51 mm

Mean radial distortion



Radial distortion for semi-diagonals referred to PPS



■ 1 □ 3 ◆ 2 ◇ 4

