System/Prescription Data

File : C:\tbida\zemax\dct\RC D11\RC_ADC_Guider_filter_wide_field_5.zmx
Title: GWAVES Wide Field Camera
Date : WED APR 14 2010
Configuration 1 of 5

LENS NOTES:

Notes...

GENERAL LENS DATA:

```
Surfaces               :              42
Stop                   :               2
System Aperture        : Entrance Pupil Diameter = 4200
Glass Catalogs         : SCHOTT INFRARED OHARA
Ray Aiming             : Off
Apodization            : Uniform, factor =   0.00000E+000
Temperature (C)        :    2.00000E+001
Pressure (ATM)         :    1.00000E+000
 Adjust Index Data To Environment  : Off
Effective Focal Length  :       -15951.13 (in air at system temperature and pressure)
Effective Focal Length  :       -15951.13 (in image space)
Back Focal Length       :        1.908163
Total Track             :        8005.254
Image Space F/#         :        3.797888
Paraxial Working F/#    :        3.809727
Working F/#             :        3.781114
Image Space NA          :       0.1297289
Object Space NA         :   2.099999e-007
Stop Radius             :            2100
Paraxial Image Height   :        4.488371
Paraxial Magnification  :               0
Entrance Pupil Diameter :            4200
Entrance Pupil Position :            6000
Exit Pupil Diameter     :        4.811526
Exit Pupil Position     :         18.1818
Field Type              : Angle in degrees
Maximum Radial Field    :      0.01612203
Primary Wavelength      :             0.5 µm
Lens Units              :   Millimeters
Angular Magnification   :        872.9047

Fields          : 7
Field Type: Angle in degrees
#        X-Value        Y-Value         Weight
 1       0.000000       0.000000       5.000000
 2       0.011400       0.011400       1.000000
 3      -0.011400       0.011400       1.000000
 4       0.011400       0.000000       1.000000
 5      -0.011400       0.000000       1.000000
 6       0.011400      -0.011400       1.000000
 7      -0.011400      -0.011400       1.000000

Vignetting Factors
#       VDX       VDY       VCX       VCY       VAN
1  0.000000 -0.006210  0.000014  0.006210  0.000000
2 -0.000255 -0.007307  0.000274  0.007309  0.000000
3  0.000255 -0.007307  0.000274  0.007309  0.000000
4  0.000000 -0.006211  0.000014  0.006211  0.000000
5  0.000000 -0.006211  0.000014  0.006211  0.000000
6  0.000000 -0.005113  0.000014  0.005113  0.000000
7  0.000000 -0.005113  0.000014  0.005113  0.000000

Wavelengths     : 5
Units: µm
#          Value         Weight
 1       0.370000       1.000000
 2       0.400000       1.000000
 3       0.500000       1.000000
 4       0.650000       1.000000
 5       0.800000       1.000000
```

SURFACE DATA SUMMARY:

| Surf | Type | Radius | Thickness | Glass | Diameter | Conic | Comment |
|---|---|---|---|---|---|---|---|
| OBJ | STANDARD | Infinity | Infinity | | 0 | 0 | |
| 1 | STANDARD | Infinity | 6000 | | 1400 | 0 | |
| STO | STANDARD | Infinity | 137.7 | | 0 | 0 | APERTURE STOP |
| 3 | STANDARD | -16000 | -5619.743 | MIRROR | 4201 | -1.082674 | PRIMARY |
| 4 | STANDARD | -6926.407 | 5619.743 | MIRROR | 1310 | -4.500899 | SECONDARY |
| 5 | STANDARD | Infinity | 400 | | 0 | 0 | Primary hole |
| 6 | TILTSURF | - | 20 | F_SILICA | 470 | - | ADC 1A |
| 7 | TILTSURF | - | 20 | LLF6 | 470 | - | ADC 1B |
| 8 | STANDARD | Infinity | 10 | | 470 | 0 | |
| 9 | STANDARD | 64329.84 | 20 | F SILICA | 470 | 0 | ADC 2A |
| 10 | TILTSURF | - | 20 | LLF6 | 470 | - | ADC 2B |
| 11 | TILTSURF | - | 610 | | 470 | - | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12 | STANDARD | Infinity | 362.4985 | | | 165.4531 | 0 | Mounting flange |
| 13 | STANDARD | Infinity | 130 | | | 105.4893 | 0 | Fold Mirror |
| 14 | STANDARD | -3658.611 | 25 | | F SILICA | 350 | 0 | Element 1 |
| 15 | STANDARD | -1509.665 | 204.8154 | | | 350 | 0 | |
| 16 | STANDARD | -699.8357 | 15 | | F SILICA | 310 | 0 | Element 2 |
| 17 | STANDARD | -2007.457 | 30.24 | | | 310 | 0 | |
| 18 | COORDBRK | - | 0 | | | - | - | |
| 19 | COORDBRK | - | 0 | | | - | - | |
| 20 | BICONICX | Infinity | 0 | | MIRROR | 70 | 0 | Pickoff Mirror |
| 21 | COORDBRK | - | -94.76 | | | - | - | |
| 22 | STANDARD | Infinity | -40.6312 | | | 22.92062 | 0 | |
| 23 | COORDBRK | - | 0 | | | - | - | probe tilt bias |
| 24 | STANDARD | Infinity | -7 | | | 16.40338 | 0 | TEL FOCUS |
| 25 | STANDARD | Infinity | -20 | | N-BK7 | 20 | 0 | Beamsplitter |
| 26 | STANDARD | Infinity | -3.4 | | N-BK7 | 20 | 0 | FL 011-1365 |
| 27 | STANDARD | 36.33 | -54.35517 | | | 20 | 0 | |
| 28 | STANDARD | -32.13957 | -2 | | N-KZFS11 | 20 | 0 | Coll 1 |
| 29 | STANDARD | -12 | -8 | | N-FK51A | 20 | 0 | Coll 2 |
| 30 | STANDARD | 92.28585 | -4.401554 | | | 20 | 0 | |
| 31 | STANDARD | Infinity | 0 | | | 24 | 0 | Pupil |
| 32 | STANDARD | Infinity | -5 | | N-BK7 | 20 | 0 | Filter |
| 33 | STANDARD | Infinity | -9.517 | | | 20 | 0 | |
| 34 | STANDARD | -19.04589 | -6.1 | | N-FK51A | 19 | 0 | Cam 1 |
| 35 | STANDARD | 25.91594 | -5.419989 | | | 19 | 0 | |
| 36 | STANDARD | 13.95997 | -2 | | N-KZFS11 | 19 | 0 | Cam 2 |
| 37 | STANDARD | 19.93321 | -14.67273 | | | 19 | 0 | |
| 38 | STANDARD | 10.38 | -2 | | N-BK7 | 12.7 | 0 | FF 015-0066 |
| 39 | STANDARD | Infinity | -2.5 | | N-BK7 | 12.7 | 0 | Window |
| 40 | STANDARD | Infinity | -2 | | | 30 | 0 | |
| 41 | COORDBRK | - | 0 | | | - | - | |
| IMA | STANDARD | Infinity | | | | 6.656 | 0 | CCD67 |

SURFACE DATA DETAIL:

Surface OBJ : STANDARD
Surface 1 : STANDARD
Aperture : Circular Obscuration
Minimum Radius : 0
Maximum Radius : 700
Surface STO : STANDARD APERTURE STOP
Aperture : Circular Aperture
Minimum Radius : 500
Maximum Radius : 2100
Surface 3 : STANDARD PRIMARY
Mirror Substrate : Curved, Thickness = 8.40200E+001
Aperture : Circular Aperture
Minimum Radius : 500
Maximum Radius : 2100.5
Surface 4 : STANDARD SECONDARY
Mirror Substrate : Curved, Thickness = 2.62000E+001
Aperture : Circular Aperture
Minimum Radius : 0
Maximum Radius : 655
Surface 5 : STANDARD Primary hole
Surface 6 : TILTSURF ADC 1A
X Tangent : 0.0019296299
Y Tangent : 0
Aperture : Floating Aperture
Maximum Radius : 235
Surface 7 : TILTSURF ADC 1B
X Tangent : -0.016552752
Y Tangent : 0
Aperture : Floating Aperture
Maximum Radius : 235
Surface 8 : STANDARD
Aperture : Floating Aperture
Maximum Radius : 235
Surface 9 : STANDARD ADC 2A
Aperture : Floating Aperture
Maximum Radius : 235
Surface 10 : TILTSURF ADC 2B
X Tangent : 0.018515571
Y Tangent : 0
Aperture : Floating Aperture
Maximum Radius : 235
Surface 11 : TILTSURF
X Tangent : 0.0019230692
Y Tangent : 0
Aperture : Floating Aperture
Maximum Radius : 235
Surface 12 : STANDARD Mounting flange
Surface 13 : STANDARD Fold Mirror
Surface 14 : STANDARD Element 1
Aperture : Floating Aperture
Maximum Radius : 175
Surface 15 : STANDARD
Aperture : Floating Aperture
Maximum Radius : 175
Surface 16 : STANDARD Element 2
Aperture : Floating Aperture

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 Maximum Radius :           155
Surface  17     : STANDARD
 Aperture       : Floating Aperture
 Maximum Radius :           155
Surface  18     : COORDBRK
 Decenter X     :                0
 Decenter Y     :                0
 Tilt About X   :                0
 Tilt About Y   :                0
 Tilt About Z   :                0
 Order          : Decenter then tilt
Surface  19     : COORDBRK
 Decenter X     :                0
 Decenter Y     :                0
 Tilt About X   :               45
 Tilt About Y   :                0
 Tilt About Z   :                0
 Order          : Decenter then tilt
Surface  20     : BICONICX Pickoff Mirror
 Mirror Substrate : Curved, Thickness = 1.40000E+000
 X Radius       :                0
 X Conic        :                0
 Aperture       : Floating Aperture
 Maximum Radius :             35
Surface  21     : COORDBRK
 Decenter X     :                0
 Decenter Y     :                0
 Tilt About X   :               45
 Tilt About Y   :                0
 Tilt About Z   :                0
 Order          : Decenter then tilt
Surface  22     : STANDARD
Surface  23     : COORDBRK probe tilt bias
 Decenter X     :                0
 Decenter Y     :                0
 Tilt About X   :                0
 Tilt About Y   :                0
 Tilt About Z   :                0
 Order          : Decenter then tilt
Surface  24     : STANDARD TEL FOCUS
 Aperture       : Circular Aperture
 Minimum Radius :              0
 Maximum Radius :            0.5
Surface  25     : STANDARD Beamsplitter
 Aperture       : Rectangular Aperture
 X Half Width   :             10
 Y Half Width   :             10
Surface  26     : STANDARD FL 011-1365
Surface  27     : STANDARD
 Aperture       : Floating Aperture
 Maximum Radius :             10
Surface  28     : STANDARD Coll 1
 Aperture       : Floating Aperture
 Maximum Radius :             10
Surface  29     : STANDARD Coll 2
 Aperture       : Floating Aperture
 Maximum Radius :             10
Surface  30     : STANDARD
 Aperture       : Floating Aperture
 Maximum Radius :             10
Surface  31     : STANDARD Pupil
Surface  32     : STANDARD Filter
 Aperture       : Floating Aperture
 Maximum Radius :             10
Surface  33     : STANDARD
 Aperture       : Floating Aperture
 Maximum Radius :             10
Surface  34     : STANDARD Cam 1
 Aperture       : Floating Aperture
 Maximum Radius :            9.5
Surface  35     : STANDARD
 Aperture       : Floating Aperture
 Maximum Radius :            9.5
Surface  36     : STANDARD Cam 2
 Aperture       : Floating Aperture
 Maximum Radius :            9.5
Surface  37     : STANDARD
 Aperture       : Floating Aperture
 Maximum Radius :            9.5
Surface  38     : STANDARD FF 015-0066
 Aperture       : Floating Aperture
 Maximum Radius :           6.35
Surface  39     : STANDARD Window
 Aperture       : Floating Aperture
 Maximum Radius :           6.35
Surface  40     : STANDARD
 Aperture       : Floating Aperture
 Maximum Radius :             15
Surface  41     : COORDBRK
 Decenter X     :                0
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 Decenter Y     :               0
 Tilt About X   :               0
 Tilt About Y   :               0
 Tilt About Z   :               0
 Order          : Decenter then tilt
Surface IMA     : STANDARD CCD67
 Aperture       : Rectangular Aperture
 X Half Width   :         3.328
 Y Half Width   :         3.328

COATING DEFINITIONS:


EDGE THICKNESS DATA:

Surf          X-Edge          Y-Edge
   1    6000.000000    6000.000000
 STO      -0.129054      -0.129054
   3   -5512.645616   -5512.645616
   4    5650.474670    5650.474670
   5     400.453463     400.000000
   6      15.656640      20.000000
   7      23.889897      20.000000
   8      10.429235      10.429235
   9      23.921925      19.570765
  10      16.100762      20.000000
  11     609.548079     610.000000
  12     362.498460     362.498460
  13     125.812272     125.812272
  14      19.010441      19.010441
  15     197.612150     197.612150
  16      26.387686      26.387686
  17      36.232884      36.232884
  18       0.000000       0.000000
  19       0.000000       0.000000
  20       0.000000       0.000000
  21     -94.760000     -94.760000
  22     -40.631200     -40.631200
  23       0.000000       0.000000
  24      -7.000000      -7.000000
  25     -20.000000     -20.000000
  26      -1.996622      -1.996622
  27     -57.353853     -57.353853
  28      -5.771443      -5.771443
  29      -2.089855      -2.089855
  30      -4.944949      -4.944949
  31       0.000000       0.000000
  32      -5.000000      -5.000000
  33     -12.055440     -12.055440
  34      -1.757566      -1.757566
  35      -3.492929      -3.492929
  36      -3.321624      -3.321624
  37     -14.913240     -14.913240
  38      -4.168916      -4.168916
  39      -2.500000      -2.500000
  40      -2.000000      -2.000000
  41       0.000000       0.000000
 IMA       0.000000       0.000000

MULTI-CONFIGURATION DATA:

Configuration   1:

  1 Thickness  22 :      -40.6312
  2 Param 2    18 :             0
  3 Param 3    41 :             0
  4 Y-field     1 :             0

Configuration   2:

  1 Thickness  22 :      -40.6224
  2 Param 2    18 :          37.2
  3 Param 3    41 :             0
  4 Y-field     1 :        0.0835

Configuration   3:

  1 Thickness  22 :      -40.6099
  2 Param 2    18 :          74.3
  3 Param 3    41 :             0
  4 Y-field     1 :        0.1665

Configuration   4:

  1 Thickness  22 :      -40.6408
  2 Param 2    18 :         111.7
  3 Param 3    41 :             0
  4 Y-field     1 :          0.25

Configuration   5:
```

| | | | |
|---|---|---|---|
| 1 Thickness | 22 : | -40.714 | |
| 2 Param 2 | 18 : | 134.3 | |
| 3 Param 3 | 41 : | 0 | |
| 4 Y-field | 1 : | 0.3 | |

SOLVE AND VARIABLE DATA:

Semi Diameter 1 : Fixed
Semi Diameter 2 : Fixed
Semi Diameter 3 : Fixed
Thickness of 4 : Solve, Pickup from surface 3 scaled by -1, offset by 0
Semi Diameter 4 : Fixed
Semi Diameter 5 : Fixed
Semi Diameter 6 : Fixed
Semi Diameter 7 : Solve, pickup from surface 6 scaled by 1
Semi Diameter 8 : Solve, pickup from surface 6 scaled by 1
Semi Diameter 9 : Solve, pickup from surface 6 scaled by 1
Semi Diameter 10 : Solve, pickup from surface 6 scaled by 1
Semi Diameter 11 : Solve, pickup from surface 6 scaled by 1
Semi Diameter 14 : Fixed
Semi Diameter 15 : Solve, pickup from surface 14 scaled by 1
Semi Diameter 16 : Fixed
Semi Diameter 17 : Solve, pickup from surface 16 scaled by 1
Semi Diameter 20 : Fixed
Parameter 3 Surf 21 : Solve, Pickup from surface 19 scaled by 1, offset by 0
Semi Diameter 25 : Fixed
Semi Diameter 26 : Fixed
Semi Diameter 27 : Fixed
Semi Diameter 28 : Fixed
Semi Diameter 29 : Fixed
Semi Diameter 30 : Fixed
Semi Diameter 31 : Fixed
Semi Diameter 32 : Fixed
Semi Diameter 33 : Fixed
Semi Diameter 34 : Fixed
Semi Diameter 35 : Fixed
Semi Diameter 36 : Fixed
Semi Diameter 37 : Fixed
Semi Diameter 38 : Fixed
Semi Diameter 39 : Fixed
Semi Diameter 40 : Fixed
Semi Diameter 42 : Fixed

INDEX OF REFRACTION DATA:

System Temperature: 20.0000 Celsius
System Pressure : 1.0000 Atmospheres
Absolute air index: 1.000274 at wavelength 0.500000 µm
Index data is relative to air at the system temperature and pressure.
Wavelengths are measured in air at the system temperature and pressure.

| Surf | Glass | Temp | Pres | 0.370000 | 0.400000 | 0.500000 | 0.650000 | 0.800000 | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 1 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 2 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 3 | MIRROR | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 4 | MIRROR | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 5 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 6 | F_SILICA | 20.00 | 1.00 | 1.47382578 | 1.47011612 | 1.46232649 | 1.45653497 | 1.45331725 | source: The Infrare |
| 7 | LLF6 | 20.00 | 1.00 | 1.55838493 | 1.55154395 | 1.53801292 | 1.52870639 | 1.52396349 | |
| 8 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 9 | F SILICA | 20.00 | 1.00 | 1.47382578 | 1.47011612 | 1.46232649 | 1.45653497 | 1.45331725 | source: The Infrare |
| 10 | LLF6 | 20.00 | 1.00 | 1.55838493 | 1.55154395 | 1.53801292 | 1.52870639 | 1.52396349 | |
| 11 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 12 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 13 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 14 | F_SILICA | 20.00 | 1.00 | 1.47382578 | 1.47011612 | 1.46232649 | 1.45653497 | 1.45331725 | source: The Infrare |
| 15 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 16 | F SILICA | 20.00 | 1.00 | 1.47382578 | 1.47011612 | 1.46232649 | 1.45653497 | 1.45331725 | source: The Infrare |
| 17 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 18 | <CRD BRK> | | | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 19 | <CRD BRK> | | | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 20 | MIRROR | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 21 | <CRD BRK> | | | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 22 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 23 | <CRD BRK> | | | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 24 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 25 | N-BK7 | 20.00 | 1.00 | 1.53539019 | 1.53084854 | 1.52141448 | 1.51452031 | 1.51077623 | |
| 26 | N-BK7 | 20.00 | 1.00 | 1.53539019 | 1.53084854 | 1.52141448 | 1.51452031 | 1.51077623 | |
| 27 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 28 | N-KZFS11 | 20.00 | 1.00 | 1.67450387 | 1.66508647 | 1.64642778 | 1.63359372 | 1.62703322 | |
| 29 | N-FK51A | 20.00 | 1.00 | 1.49984209 | 1.49661694 | 1.48986747 | 1.48493748 | 1.48231487 | |
| 30 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 31 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 32 | N-BK7 | 20.00 | 1.00 | 1.53539019 | 1.53084854 | 1.52141448 | 1.51452031 | 1.51077623 | |
| 33 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 34 | N-FK51A | 20.00 | 1.00 | 1.49984209 | 1.49661694 | 1.48986747 | 1.48493748 | 1.48231487 | |
| 35 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | |
| 36 | N-KZFS11 | 20.00 | 1.00 | 1.67450387 | 1.66508647 | 1.64642778 | 1.63359372 | 1.62703322 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 37 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 |
| 38 | N-BK7 | 20.00 | 1.00 | 1.53539019 | 1.53084854 | 1.52141448 | 1.51452031 | 1.51077623 |
| 39 | N-BK7 | 20.00 | 1.00 | 1.53539019 | 1.53084854 | 1.52141448 | 1.51452031 | 1.51077623 |
| 40 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 |
| 41 | <CRD BRK> | | | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 |
| 42 | | 20.00 | 1.00 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 | 1.00000000 |

THERMAL COEFFICIENT OF EXPANSION DATA:

| Surf | Glass | TCE *10E-6 | |
|---|---|---|---|
| 0 | | 0.00000000 | |
| 1 | | 0.00000000 | |
| 2 | | 0.00000000 | |
| 3 | MIRROR | 0.00000000 | |
| 4 | MIRROR | 0.00000000 | |
| 5 | | 0.00000000 | |
| 6 | F_SILICA | 0.51000000 | source: The Infrared & Electro-Optical Systems Handbook V. III |
| 7 | LLF6 | 7.50000000 | |
| 8 | | 0.00000000 | |
| 9 | F SILICA | 0.51000000 | source: The Infrared & Electro-Optical Systems Handbook V. III |
| 10 | LLF6 | 7.50000000 | |
| 11 | | 0.00000000 | |
| 12 | | 0.00000000 | |
| 13 | | 0.00000000 | |
| 14 | F_SILICA | 0.51000000 | source: The Infrared & Electro-Optical Systems Handbook V. III |
| 15 | | 0.00000000 | |
| 16 | F_SILICA | 0.51000000 | source: The Infrared & Electro-Optical Systems Handbook V. III |
| 17 | | 0.00000000 | |
| 18 | <CRD BRK> | 0.00000000 | |
| 19 | <CRD BRK> | 0.00000000 | |
| 20 | MIRROR | 0.00000000 | |
| 21 | <CRD BRK> | 0.00000000 | |
| 22 | | 0.00000000 | |
| 23 | <CRD BRK> | 0.00000000 | |
| 24 | | 0.00000000 | |
| 25 | N-BK7 | 7.10000000 | |
| 26 | N-BK7 | 7.10000000 | |
| 27 | | 0.00000000 | |
| 28 | N-KZFS11 | 6.56000000 | |
| 29 | N-FK51A | 12.74000000 | |
| 30 | | 0.00000000 | |
| 31 | | 0.00000000 | |
| 32 | N-BK7 | 7.10000000 | |
| 33 | | 0.00000000 | |
| 34 | N-FK51A | 12.74000000 | |
| 35 | | 0.00000000 | |
| 36 | N-KZFS11 | 6.56000000 | |
| 37 | | 0.00000000 | |
| 38 | N-BK7 | 7.10000000 | |
| 39 | N-BK7 | 7.10000000 | |
| 40 | | 0.00000000 | |
| 41 | <CRD BRK> | 0.00000000 | |
| 42 | | 0.00000000 | |

GLOBAL VERTEX COORDINATES, ORIENTATIONS, AND ROTATION/OFFSET MATRICES:

Reference Surface: 24

| Surf | R11 | R12 | R13 | X | |
|---|---|---|---|---|---|
| | R21 | R22 | R23 | Y | |
| | R31 | R32 | R33 | Z | |
| 1 | 1.0000000000 | 0.0000000000 | 0.0000000000 | 0.000000000E+000 | |
| | 0.0000000000 | 0.0000000000 | 1.0000000000 | -8.005253892E+003 | |
| | 0.0000000000 | -1.0000000000 | 0.0000000000 | 1.353912000E+002 | |
| 2 | 1.0000000000 | 0.0000000000 | 0.0000000000 | 0.000000000E+000 | APERTURE STOP |
| | 0.0000000000 | 0.0000000000 | 1.0000000000 | -2.005253892E+003 | |
| | 0.0000000000 | -1.0000000000 | 0.0000000000 | 1.353912000E+002 | |
| 3 | 1.0000000000 | 0.0000000000 | 0.0000000000 | 0.000000000E+000 | PRIMARY |
| | 0.0000000000 | 0.0000000000 | 1.0000000000 | -1.867553892E+003 | |
| | 0.0000000000 | -1.0000000000 | 0.0000000000 | 1.353912000E+002 | |
| 4 | 1.0000000000 | 0.0000000000 | 0.0000000000 | 0.000000000E+000 | SECONDARY |
| | 0.0000000000 | 0.0000000000 | 1.0000000000 | -7.487296998E+003 | |
| | 0.0000000000 | -1.0000000000 | 0.0000000000 | 1.353912000E+002 | |
| 5 | 1.0000000000 | 0.0000000000 | 0.0000000000 | 0.000000000E+000 | Primary hole |
| | 0.0000000000 | 0.0000000000 | 1.0000000000 | -1.867553892E+003 | |
| | 0.0000000000 | -1.0000000000 | 0.0000000000 | 1.353912000E+002 | |
| 6 | 1.0000000000 | 0.0000000000 | 0.0000000000 | 0.000000000E+000 | ADC 1A |
| | 0.0000000000 | 0.0000000000 | 1.0000000000 | -1.467553892E+003 | |
| | 0.0000000000 | -1.0000000000 | 0.0000000000 | 1.353912000E+002 | |
| 7 | 1.0000000000 | 0.0000000000 | 0.0000000000 | 0.000000000E+000 | ADC 1B |
| | 0.0000000000 | 0.0000000000 | 1.0000000000 | -1.447553892E+003 | |
| | 0.0000000000 | -1.0000000000 | 0.0000000000 | 1.353912000E+002 | |

```
 8   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000 -1.427553892E+003
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

 9   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 ADC 2A
     0.0000000000   0.0000000000   1.0000000000 -1.417553892E+003
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

10   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 ADC 2B
     0.0000000000   0.0000000000   1.0000000000 -1.397553892E+003
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

11   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000 -1.377553892E+003
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

12   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Mounting flange
     0.0000000000   0.0000000000   1.0000000000 -7.675538924E+002
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

13   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Fold Mirror
     0.0000000000   0.0000000000   1.0000000000 -4.050554324E+002
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

14   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Element 1
     0.0000000000   0.0000000000   1.0000000000 -2.750554324E+002
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

15   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000 -2.500554324E+002
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

16   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Element 2
     0.0000000000   0.0000000000   1.0000000000 -4.524000000E+001
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

17   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000 -3.024000000E+001
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

18   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000  0.000000000E+000
     0.0000000000  -1.0000000000   0.0000000000  1.353912000E+002

19   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.7071067812   0.7071067812  0.000000000E+000
     0.0000000000  -0.7071067812   0.7071067812  1.353912000E+002

20   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Pickoff Mirror
     0.0000000000   0.7071067812   0.7071067812  0.000000000E+000
     0.0000000000  -0.7071067812   0.7071067812  1.353912000E+002

21   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000  1.353912000E+002

22   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000  4.063120000E+001

23   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 probe tilt bias
     0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000  0.000000000E+000

24   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 TEL FOCUS
     0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000  0.000000000E+000

25   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Beamsplitter
     0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000 -7.000000000E+000

26   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 FL 011-1365
     0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000 -2.700000000E+001

27   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000 -3.040000000E+001

28   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Coll 1
     0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000 -8.475516667E+001

29   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Coll 2
     0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   0.0000000000   1.0000000000 -8.675516667E+001

30   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
     0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
```

```
      0.0000000000   0.0000000000   1.0000000000 -9.475516667E+001

 31   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Pupil
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -9.915672074E+001

 32   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Filter
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -9.915672074E+001

 33   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -1.041567207E+002

 34   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Cam 1
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -1.136737207E+002

 35   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -1.197737207E+002

 36   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Cam 2
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -1.251937101E+002

 37   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -1.271937101E+002

 38   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 FF 015-0066
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -1.418664364E+002

 39   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 Window
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -1.438664364E+002

 40   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -1.463664364E+002

 41   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -1.483664364E+002

 42   1.0000000000   0.0000000000   0.0000000000  0.000000000E+000 CCD67
      0.0000000000   1.0000000000   0.0000000000  0.000000000E+000
      0.0000000000   0.0000000000   1.0000000000 -1.483664364E+002


GLOBAL SURFACE CENTER OF CURVATURE POINTS:

Reference Surface: 24

Surf             X              Y              Z
  1              -              -              -
  2              -              -              - APERTURE STOP
  3   0.0000000000 -17867.5538923960 135.3912000000 PRIMARY
  4   0.0000000000 -14413.7039735618 135.3912000000 SECONDARY
  5              -              -              - Primary hole
  6              -              -              - ADC 1A
  7              -              -              - ADC 1B
  8              -              -              -
  9   0.0000000000 62912.2826835877 135.3912000000 ADC 2A
 10              -              -              - ADC 2B
 11              -              -              -
 12              -              -              - Mounting flange
 13              -              -              - Fold Mirror
 14   0.0000000000 -3933.6666851662 135.3912000000 Element 1
 15   0.0000000000 -1759.7199558024 135.3912000000
 16   0.0000000000 -745.0756611012 135.3912000000 Element 2
 17   0.0000000000 -2037.6972085590 135.3912000000
 18              -              -              -
 19              -              -              -
 20              -              -              - Pickoff Mirror
 21              -              -              -
 22              -              -              -
 23              -              -              - probe tilt bias
 24              -              -              - TEL FOCUS
 25              -              -              - Beamsplitter
 26              -              -              - FL 011-1365
 27   0.0000000000   0.0000000000   5.9300000000
 28   0.0000000000   0.0000000000 -116.8947345661 Coll 1
 29   0.0000000000   0.0000000000 -98.7551666710 Coll 2
 30   0.0000000000   0.0000000000  -2.4693135534
 31              -              -              - Pupil
 32              -              -              - Filter
 33              -              -              -
 34   0.0000000000   0.0000000000 -132.7196072918 Cam 1
```

```
 35   0.0000000000   0.0000000000 -93.8577772324
 36   0.0000000000   0.0000000000 -111.2337447970 Cam 2
 37   0.0000000000   0.0000000000 -107.2604957578
 38   0.0000000000   0.0000000000 -131.4864364448 FF 015-0066
 39             -              -             - Window
 40             -              -             -
 41             -              -             -
 42             -              -             - CCD67
```

ELEMENT VOLUME DATA:

For centered elements with plane or spherical circular faces, exact volumes are computed by assuming edges are squared up to the larger of the front and back radial aperture.

For all other elements, approximate volumes are numerically integrated to 0.1% accuracy. Zero volume means the volume cannot be accurately computed.

Single elements that are duplicated in the Lens Data Editor for ray tracing purposes may be listed more than once yielding incorrect total mass estimates.

| | Volume cc | Density g/cc | Mass g |
|---|---|---|---|
| Element surf 6 to 7 | 3470.841375 | 2.200000 | 7635.851026 |
| Element surf 7 to 8 | 3470.841375 | 2.810000 | 9753.064265 |
| Element surf 9 to 10 | 3433.586117 | 2.200000 | 7553.889458 |
| Element surf 10 to 11 | 3470.841375 | 2.810000 | 9753.064265 |
| Element surf 14 to 15 | 2117.663826 | 2.200000 | 4658.860416 |
| Element surf 16 to 17 | 1559.267873 | 2.200000 | 3430.389320 |
| Element surf 25 to 26 | 0.000000 | 2.510000 | 0.000000 |
| Element surf 26 to 27 | 0.849147 | 2.510000 | 2.131358 |
| Element surf 28 to 29 | 1.141927 | 3.196000 | 3.649598 |
| Element surf 29 to 30 | 1.665929 | 3.675000 | 6.122289 |
| Element surf 32 to 33 | 1.570796 | 2.510000 | 3.942699 |
| Element surf 34 to 35 | 1.125561 | 3.675000 | 4.136438 |
| Element surf 36 to 37 | 0.734545 | 3.196000 | 2.347607 |
| Element surf 38 to 39 | 0.385387 | 2.510000 | 0.967322 |
| Element surf 39 to 40 | 1.767146 | 2.510000 | 4.435536 |
| Total Mass: | | | 42812.851596 |

F/# DATA:

F/# calculations consider vignetting factors and ignore surface apertures.

| Wavelength: | 0.370000 | | 0.400000 | | 0.500000 | |
|---|---|---|---|---|---|---|
| # Field | Tan | Sag | Tan | Sag | Tan | Sag |
| 1 0.0000, 0.0000 deg: | 3.8021 | 3.7873 | 3.7925 | 3.7773 | 3.7890 | 3.7733 |
| 2 0.0114, 0.0114 deg: | 3.8582 | 3.8404 | 3.8484 | 3.8303 | 3.8450 | 3.8265 |
| 3 -0.0114, 0.0114 deg: | 3.8586 | 3.8410 | 3.8488 | 3.8309 | 3.8455 | 3.8271 |
| 4 0.0114, 0.0000 deg: | 3.8221 | 3.8141 | 3.8124 | 3.8041 | 3.8088 | 3.8003 |
| 5 -0.0114, 0.0000 deg: | 3.8224 | 3.8145 | 3.8127 | 3.8046 | 3.8092 | 3.8008 |
| 6 0.0114, -0.0114 deg: | 3.8509 | 3.8396 | 3.8411 | 3.8295 | 3.8379 | 3.8257 |
| 7 -0.0114, -0.0114 deg: | 3.8513 | 3.8401 | 3.8416 | 3.8301 | 3.8384 | 3.8264 |

| Wavelength: | 0.650000 | | 0.800000 | |
|---|---|---|---|---|
| # Field | Tan | Sag | Tan | Sag |
| 1 0.0000, 0.0000 deg: | 3.7990 | 3.7829 | 3.8085 | 3.7922 |
| 2 0.0114, 0.0114 deg: | 3.8552 | 3.8363 | 3.8648 | 3.8458 |
| 3 -0.0114, 0.0114 deg: | 3.8557 | 3.8370 | 3.8653 | 3.8465 |
| 4 0.0114, 0.0000 deg: | 3.8188 | 3.8100 | 3.8283 | 3.8195 |
| 5 -0.0114, 0.0000 deg: | 3.8191 | 3.8106 | 3.8287 | 3.8201 |
| 6 0.0114, -0.0114 deg: | 3.8482 | 3.8356 | 3.8579 | 3.8451 |
| 7 -0.0114, -0.0114 deg: | 3.8487 | 3.8363 | 3.8584 | 3.8458 |

CARDINAL POINTS:

Object space positions are measured with respect to surface 1.
Image space positions are measured with respect to the image surface.
The index in both the object space and image space is considered.

| | Object Space | Image Space |
|---|---|---|
| W = 0.370000 | | |
| Focal Length : | 15972.871225 | 15972.871225 |
| Focal Planes : | -13926201.134862 | -0.102134 |
| Principal Planes : | -13942174.006087 | -15972.973359 |
| Anti-Principal Planes : | -13910228.263637 | 15972.769092 |
| Nodal Planes : | -13910228.263637 | 15972.769092 |
| Anti-Nodal Planes : | -13942174.006087 | -15972.973359 |
| W = 0.400000 | | |
| Focal Length : | 15944.803696 | 15944.803696 |
| Focal Planes : | -13906665.727363 | -0.072495 |
| Principal Planes : | -13922610.531059 | -15944.876191 |
| Anti-Principal Planes : | -13890720.923667 | 15944.731201 |
| Nodal Planes : | -13890720.923667 | 15944.731201 |
| Anti-Nodal Planes : | -13922610.531059 | -15944.876191 |
| W = 0.500000 (Primary) | | |
| Focal Length : | 15951.131287 | 15951.131287 |
| Focal Planes : | -13917818.122788 | -0.091837 |

```
Principal Planes      :    -13933769.254075       -15951.223124
Anti-Principal Planes :    -13901866.991501        15951.039450
Nodal Planes          :    -13901866.991501        15951.039450
Anti-Nodal Planes     :    -13933769.254075       -15951.223124

W = 0.650000
Focal Length          :        16004.230034        16004.230034
Focal Planes          :    -13963094.983961           -0.169103
Principal Planes      :    -13979099.213995       -16004.399138
Anti-Principal Planes :    -13947090.753926        16004.060931
Nodal Planes          :    -13947090.753926        16004.060931
Anti-Nodal Planes     :    -13979099.213995       -16004.399138

W = 0.800000
Focal Length          :        16048.855911        16048.855911
Focal Planes          :    -13998744.118929           -0.233250
Principal Planes      :    -14014792.974840       -16049.089161
Anti-Principal Planes :    -13982695.263019        16048.622661
Nodal Planes          :    -13982695.263019        16048.622661
Anti-Nodal Planes     :    -14014792.974840       -16049.089161

PHYSICAL OPTICS PROPAGATION SETTINGS SUMMARY:

 OBJ STANDARD
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
   1 STANDARD
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
 STO STANDARD        APERTURE STOP
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
   3 STANDARD              PRIMARY
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
   4 STANDARD            SECONDARY
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
   5 STANDARD         Primary hole
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
   6 TILTSURF              ADC 1A
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
   7 TILTSURF              ADC 1B
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
   8 STANDARD
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
   9 STANDARD              ADC 2A
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
  10 TILTSURF              ADC 2B
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
  11 TILTSURF
```

```
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
12 STANDARD      Mounting flange
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
13 STANDARD          Fold Mirror
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
14 STANDARD            Element 1
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
15 STANDARD
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
16 STANDARD            Element 2
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
17 STANDARD
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
18 COORDBRK
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
19 COORDBRK
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
20 BICONICX       Pickoff Mirror
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
21 COORDBRK
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
22 STANDARD
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
23 COORDBRK      probe tilt bias
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
24 STANDARD            TEL FOCUS
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
25 STANDARD         Beamsplitter
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
26 STANDARD          FL 011-1365
```

```
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
27 STANDARD
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
28 STANDARD               Coll 1
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
29 STANDARD               Coll 2
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
30 STANDARD
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
31 STANDARD                Pupil
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
32 STANDARD               Filter
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
33 STANDARD
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
34 STANDARD                Cam 1
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
35 STANDARD
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
36 STANDARD                Cam 2
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
37 STANDARD
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
38 STANDARD          FF 015-0066
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
39 STANDARD               Window
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
40 STANDARD
  Use Rays To Propagate To Next Surface  : Off
  Recompute Pilot Beam                   : Off
  Do Not Rescale Beam Size Using Ray Data: Off
  Use Angular Spectrum Propagator        : Off
  Output Pilot Radius                    : Best Fit
41 COORDBRK
```

```
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit
 IMA STANDARD               CCD67
    Use Rays To Propagate To Next Surface  : Off
    Recompute Pilot Beam                   : Off
    Do Not Rescale Beam Size Using Ray Data: Off
    Use Angular Spectrum Propagator        : Off
    Output Pilot Radius                    : Best Fit

FILES USED:

ZEMAX File
  C:\TBIDA\ZEMAX\DCT\RC_D11\RC_ADC_GUIDER_FILTER_WIDE_FIELD_5.ZMX
Session File
  C:\TBIDA\ZEMAX\DCT\RC_D11\RC_ADC_GUIDER_FILTER_WIDE_FIELD_5.SES
Glass Catalogs
  C:\PROGRAM FILES\ZEMAX\GLASSCAT\SCHOTT.AGF
  C:\PROGRAM FILES\ZEMAX\GLASSCAT\INFRARED.AGF
  C:\PROGRAM FILES\ZEMAX\GLASSCAT\OHARA.AGF
Coating Data
  C:\PROGRAM FILES\ZEMAX\COATINGS\COATING.DAT
```