

System/Prescription Data

File : C:\Users\Kops Laptop\Dropbox\KOPS &
Prof\Customers_Apple\zemax\Matsusaka\12_11_2022 Matsusaka example 19 preferred.zos
Title:
Date : 1/17/2023

GENERAL LENS DATA:

Surfaces	:	17	
Stop	:	8	
System Aperture	:	Image Space F/# =	3
Fast Semi-Diameters	:	On	
Field Unpolarized	:	On	
Convert thin film phase to ray equivalent	:	On	
J/E Conversion Method	:	X Axis Reference	
Glass Catalogs	:	SCHOTT	
Ray Aiming	:	Real Reference, Cache On	
Automatically Calculate Pupil Shifts	:	On	
Scale Pupil Shift Factors By Field	:	On	
X Pupil Shift	:	0	
Y Pupil Shift	:	0	
Z Pupil Shift	:	-1.278417	
X Pupil Compress	:	0	
Y Pupil Compress	:	0	
Apodization	:	Uniform, factor =	0.00000E+00
Reference OPD	:	Exit Pupil	
Paraxial Rays Setting	:	Ignore Coordinate Breaks	
Method to Compute F/#	:	Tracing Rays	
Method to Compute Huygens Integral	:	Auto	
Print Coordinate Breaks	:	On	
Multi-Threading	:	On	
OPD Modulo 2 Pi	:	Off	
Temperature (C)	:	2.00000E+01	
Pressure (ATM)	:	1.00000E+00	
Adjust Index Data To Environment	:	Off	
Effective Focal Length	:	1.00961	(in air at system temperature and pressure)
Effective Focal Length	:	1.00961	(in image space)
Back Focal Length	:	0.1408578	
Total Track	:	11.631	
Image Space F/#	:	3	
Paraxial Working F/#	:	3	
Working F/#	:	2.961092	
Image Space NA	:	0.164399	
Object Space NA	:	1.682683e-11	
Stop Radius	:	0.4195353	
Paraxial Image Height	:	5.72578	
Paraxial Magnification	:	0	
Entrance Pupil Diameter	:	0.3365365	
Entrance Pupil Position	:	3.372872	
Exit Pupil Diameter	:	2.254766	
Exit Pupil Position	:	-6.672733	
Field Type	:	Angle in degrees	
Maximum Radial Field	:	100	
Primary Wavelength [μm]	:	0.5875618	
Angular Magnification	:	0.1503829	
Lens Units	:	Millimeters	
Source Units	:	Watts	
Analysis Units	:	Watts/cm^2	
Afocal Mode Units	:	milliradians	
MTF Units	:	cycles/millimeter	

Include Calculated Data in Session File : On
 Include Calculated Data in Session File : On

Fields : 11

Field Type	: Angle in degrees		
#	X-Value	Y-Value	Weight
1	0.000000	0.000000	1.000000
2	0.000000	10.000000	1.000000
3	0.000000	20.000000	1.000000
4	0.000000	30.000000	1.000000
5	0.000000	40.000000	1.000000
6	0.000000	50.000000	1.000000
7	0.000000	60.000000	1.000000
8	0.000000	70.000000	1.000000
9	0.000000	80.000000	1.000000
10	0.000000	90.000000	1.000000
11	0.000000	100.000000	1.000000

Vignetting Factors

#	VDX	VDY	VCX	VCY	VAN
1	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000	0.000000	0.000000
3	0.000000	0.000000	0.000000	0.000000	0.000000
4	0.000000	0.000000	0.000000	0.000000	0.000000
5	0.000000	0.000000	0.000000	0.000000	0.000000
6	0.000000	0.000000	0.000000	0.000000	0.000000
7	0.000000	0.000000	0.000000	0.000000	0.000000
8	0.000000	0.000000	0.000000	0.000000	0.000000
9	0.000000	0.000000	0.000000	0.000000	0.000000
10	0.000000	0.000000	0.000000	0.000000	0.000000
11	0.000000	0.000000	0.000000	0.000000	0.000000

Wavelengths : 3

Units: μm

#	Value	Weight
1	0.486133	0.500000
2	0.587562	1.000000
3	0.656273	0.500000

Predicted coordinate ABCD matrix:

A = 1.003
 B = 0
 C = 0
 D = 1.003

SURFACE DATA SUMMARY:

Surf	Type	Radius	Thickness	Glass
	Clear Diam	Chip Zone	Mech Diam	Conic
	Comment			
OBJ	STANDARD	Infinity	Infinity	
	0	0	0	0
1	STANDARD	20	1	
	20.93057	0	20.93057	0
2	STANDARD	10.286	0.9	1.834810, 42.720000
	8.056296	0	8.056296	0
	1st element			
3	STANDARD	2.3	1.638	
	4.127728	0	8.056296	0

4	EVENASPH	38.903		0.8	1.530480, 55.720000	
	3.750653		0	3.750653		292.36
	2nd element					
5	EVENASPH	0.812		0.416		
	2.39213		0	3.750653		-1
6	EVENASPH	1.623		1.392	1.632000, 23.410000	
	2.391706		0	2.391706		0
	3rd element					
7	EVENASPH	-4.562		0.561		
	2		0	2.391706		0
STO	STANDARD	Infinity		0.132		
	0.8454076		0	0.8454076		0
	STOP					
9	EVENASPH	6.361		0.921	1.530480, 55.720000	
	1.050069		0	1.519357		0
	4th element					
10	EVENASPH	-1.232		0.171		
	1.519357		0	1.519357		0
11	EVENASPH	-1.225		0.8	1.632000, 23.410000	
	1.548818		0	2.2		0
	5th element					
12	EVENASPH	-3.876		0.1		
	2.2		0	2.2		0
13	EVENASPH	3.352		0.8	1.530480, 55.720000	
	2.8		0	2.8		0
	7th element					
14	EVENASPH	-3.49		1.4		
	2.658832		0	2.8		-0.54212
15	STANDARD	Infinity		0.5	1.516800, 64.200000	
	4.4		0	4.4		0
	filter					
16	STANDARD	Infinity		0.1		
	4.4		0	4.4		0
IMA	STANDARD	Infinity				
	4.4		0	4.4		0
	sensor					

SURFACE DATA DETAIL:

Surface OBJ STANDARD

Surface 1 STANDARD

Surface 2 STANDARD 1st element

Surface 3 STANDARD

Surface 4 EVENASPH 2nd element

Coefficient on r^ 2	:	0
Coefficient on r^ 4	:	-0.03137
Coefficient on r^ 6	:	0.0022308
Coefficient on r^ 8	:	0.00052741
Coefficient on r^10	:	-1.5873e-05
Coefficient on r^12	:	-1.1768e-05
Coefficient on r^14	:	0

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Coefficient on r^16      :          0

Surface   5  EVENASPH
Coefficient on r^ 2      :          0
Coefficient on r^ 4      :      0.01758
Coefficient on r^ 6      :      -0.017
Coefficient on r^ 8      :     -0.0037365
Coefficient on r^10      :     -0.0056654
Coefficient on r^12      :      0.002767
Coefficient on r^14      :          0
Coefficient on r^16      :          0

Surface   6  EVENASPH 3rd element
Coefficient on r^ 2      :          0
Coefficient on r^ 4      :      0.038489
Coefficient on r^ 6      :      0.0077933
Coefficient on r^ 8      :     -0.0076891
Coefficient on r^10      :     -0.0028251
Coefficient on r^12      :          0
Coefficient on r^14      :          0
Coefficient on r^16      :          0

Surface   7  EVENASPH
Coefficient on r^ 2      :          0
Coefficient on r^ 4      :      0.049059
Coefficient on r^ 6      :      0.02021
Coefficient on r^ 8      :     -0.00082269
Coefficient on r^10      :     -0.010916
Coefficient on r^12      :          0
Coefficient on r^14      :          0
Coefficient on r^16      :          0
Aperture                : Floating Aperture
Maximum Radius          :          1

Surface STO STANDARD STOP

Surface   9  EVENASPH 4th element
Coefficient on r^ 2      :          0
Coefficient on r^ 4      :      0.02
Coefficient on r^ 6      :     -0.18626
Coefficient on r^ 8      :     -0.40585
Coefficient on r^10      :      0.40853
Coefficient on r^12      :          0
Coefficient on r^14      :          0
Coefficient on r^16      :          0

Surface  10  EVENASPH
Coefficient on r^ 2      :          0
Coefficient on r^ 4      :      0.088
Coefficient on r^ 6      :     -0.27312
Coefficient on r^ 8      :     -0.24511
Coefficient on r^10      :      0.295
Coefficient on r^12      :          0
Coefficient on r^14      :          0
Coefficient on r^16      :          0

Surface  11  EVENASPH 5th element
Coefficient on r^ 2      :          0
Coefficient on r^ 4      :      0.063
Coefficient on r^ 6      :     -0.15499
Coefficient on r^ 8      :     -0.2872
Coefficient on r^10      :      0.425
Coefficient on r^12      :          0

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Coefficient on r^{14} : 0
Coefficient on r^{16} : 0

Surface 12 EVENASPH
Coefficient on r^2 : 0
Coefficient on r^4 : -0.10227
Coefficient on r^6 : 0.033583
Coefficient on r^8 : 0.026008
Coefficient on r^{10} : -0.014902
Coefficient on r^{12} : 0
Coefficient on r^{14} : 0
Coefficient on r^{16} : 0
Aperture : Floating Aperture
Maximum Radius : 1.1

Surface 13 EVENASPH 7th element
Coefficient on r^2 : 0
Coefficient on r^4 : 0.011593
Coefficient on r^6 : 0.0040494
Coefficient on r^8 : -0.0010841
Coefficient on r^{10} : 0.00054889
Coefficient on r^{12} : -0.0011743
Coefficient on r^{14} : 0
Coefficient on r^{16} : 0
Aperture : Floating Aperture
Maximum Radius : 1.4

Surface 14 EVENASPH
Coefficient on r^2 : 0
Coefficient on r^4 : 0.17965
Coefficient on r^6 : -0.031584
Coefficient on r^8 : 0.0008052
Coefficient on r^{10} : -9.2598e-05
Coefficient on r^{12} : -0.00010121
Coefficient on r^{14} : 0
Coefficient on r^{16} : 0

Surface 15 STANDARD filter
Aperture : Floating Aperture
Maximum Radius : 2.2

Surface 16 STANDARD
Aperture : Floating Aperture
Maximum Radius : 2.2

Surface IMA STANDARD sensor

EDGE THICKNESS DATA:

Surf	Edge
1	-1.135041
2	1.363332
3	0.169829
4	1.824512
5	0.152928
6	0.760429
7	0.614420
STO	0.149630
9	0.609782
10	0.173802
11	0.858281
12	0.647197
13	0.617716

14	1.267593
15	0.500000
16	0.100000
IMA	0.000000

INDEX OF REFRACTION DATA:

System Temperature: 20.0000 Celsius
System Pressure : 1.0000 Atmospheres
Absolute air index: 1.000272 at wavelength 0.587562 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	0.48613270
0.58756180	0.65627250			
0		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			
1		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			
2	<MODEL>	20.00	1.00	1.8485504525
1.8348138287	1.8290169568			
3		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			
4	<MODEL>	20.00	1.00	1.5371130289
1.5304818872	1.5275963881			
5		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			
6	<MODEL>	20.00	1.00	1.6512407094
1.6320051973	1.6242548674			
7		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			
8		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			
9	<MODEL>	20.00	1.00	1.5371130289
1.5304818872	1.5275963881			
10		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			
11	<MODEL>	20.00	1.00	1.6512407094
1.6320051973	1.6242548674			
12		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			
13	<MODEL>	20.00	1.00	1.5371130289
1.5304818872	1.5275963881			
14		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			
15	<MODEL>	20.00	1.00	1.5223746605
1.5168016078	1.5143280185			
16		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			
17		20.00	1.00	1.0000000000
1.0000000000	1.0000000000			

THERMAL COEFFICIENT OF EXPANSION DATA:

Surf	Glass	TCE * 10E-6
0		0.0000000000
1		0.0000000000
2	<MODEL>	0.0000000000
3		0.0000000000
4	<MODEL>	0.0000000000
5		0.0000000000
6	<MODEL>	0.0000000000
7		0.0000000000

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8          0.0000000000
9          <MODEL>      0.0000000000
10         0.0000000000
11         <MODEL>      0.0000000000
12         0.0000000000
13         <MODEL>      0.0000000000
14         0.0000000000
15         <MODEL>      0.0000000000
16         0.0000000000
17         0.0000000000

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

Reference Surface: 4

Surf	X	R11 Tilt X	R12	R13
	Y	R21 Tilt Y	R22	R23
	Z	R31 Tilt Z	R32	R33
1	1.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00	0.0000000000 1.0000000000 0.0000000000 0.0000000000	0.0000000000 0.0000000000 1.0000000000 0.0000000000	0.000000000E+00 0.000000000E+00 -3.538000000E+00 0.000000000E+00
2	1.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00	0.0000000000 1st element 1.0000000000 0.0000000000 0.0000000000	0.0000000000 0.0000000000 1.0000000000 0.0000000000	0.000000000E+00 0.000000000E+00 -2.538000000E+00 0.000000000E+00
3	1.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00	0.0000000000 1.0000000000 0.0000000000 0.0000000000	0.0000000000 0.0000000000 1.0000000000 0.0000000000	0.000000000E+00 0.000000000E+00 -1.638000000E+00 0.000000000E+00
4	1.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00	0.0000000000 2nd element 1.0000000000 0.0000000000 0.0000000000	0.0000000000 0.0000000000 1.0000000000 0.0000000000	0.000000000E+00 0.000000000E+00 0.000000000E+00 0.000000000E+00
5	1.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00	0.0000000000 1.0000000000 0.0000000000 0.0000000000	0.0000000000 0.0000000000 1.0000000000 0.0000000000	0.000000000E+00 0.000000000E+00 8.000000000E-01 0.000000000E+00
6	1.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00 0.0000000000 0.000000000E+00	0.0000000000 3rd element 1.0000000000 0.0000000000 0.0000000000	0.0000000000 0.0000000000 1.0000000000 0.0000000000	0.000000000E+00 0.000000000E+00 1.216000000E+00 0.000000000E+00

7	1.0000000000	0.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00			
	0.0000000000	1.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00			
	0.0000000000	0.0000000000	1.0000000000	2.608000000E+00
8	0.000000000E+00			
	1.0000000000	0.0000000000	0.0000000000	0.000000000E+00
	0.0000000000	STOP		
	0.000000000E+00	1.0000000000	0.0000000000	0.000000000E+00
	0.0000000000	0.0000000000	1.0000000000	3.169000000E+00
9	0.000000000E+00			
	1.0000000000	0.0000000000	0.0000000000	0.000000000E+00
	0.0000000000	4th element		
	0.000000000E+00	1.0000000000	0.0000000000	0.000000000E+00
	0.0000000000	0.0000000000	1.0000000000	3.301000000E+00
10	0.000000000E+00			
	1.0000000000	0.0000000000	0.0000000000	0.000000000E+00
	0.0000000000	1.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00			
	0.0000000000	0.0000000000	1.0000000000	4.222000000E+00
11	0.000000000E+00			
	1.0000000000	0.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00	5th element		
	0.0000000000	1.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00	0.0000000000	1.0000000000	4.393000000E+00
12	0.000000000E+00			
	1.0000000000	0.0000000000	0.0000000000	0.000000000E+00
	0.0000000000	1.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00			
	0.0000000000	0.0000000000	1.0000000000	5.193000000E+00
13	0.000000000E+00			
	1.0000000000	0.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00	7th element		
	0.0000000000	1.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00	0.0000000000	1.0000000000	5.293000000E+00
14	0.000000000E+00			
	1.0000000000	0.0000000000	0.0000000000	0.000000000E+00
	0.0000000000	1.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00			
	0.0000000000	0.0000000000	1.0000000000	6.093000000E+00
15	0.000000000E+00			
	1.0000000000	0.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00	filter		
	0.0000000000	1.0000000000	0.0000000000	0.000000000E+00
	0.000000000E+00	0.0000000000	1.0000000000	7.493000000E+00

16	1.0000000000	0.0000000000	0.0000000000	0.0000000000E+00
	0.0000000000E+00			
	0.0000000000	1.0000000000	0.0000000000	0.0000000000E+00
	0.0000000000E+00			
	0.0000000000	0.0000000000	1.0000000000	7.9930000000E+00
	0.0000000000E+00			
17	1.0000000000	0.0000000000	0.0000000000	0.0000000000E+00
	0.0000000000E+00	sensor		
	0.0000000000	1.0000000000	0.0000000000	0.0000000000E+00
	0.0000000000E+00			
	0.0000000000	0.0000000000	1.0000000000	8.0930000000E+00
	0.0000000000E+00			

F/# DATA:

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

Wavelength:		0.486133	0.587562			
#	Tan	Field Sag	Tan	Sag	Tan	Sag
1	0.00 (deg):	2.9204	2.9204	2.9611	2.9611	
	2.9791	2.9791				
2	10.00 (deg):	2.9547	2.9325	2.9972	2.9739	
	3.0160	2.9923				
3	20.00 (deg):	3.0570	2.9682	3.1054	3.0118	
	3.1267	3.0311				
4	30.00 (deg):	3.2245	3.0259	3.2839	3.0732	
	3.3101	3.0942				
5	40.00 (deg):	3.4512	3.1052	3.5282	3.1579	
	3.5619	3.1812				
6	50.00 (deg):	3.7333	3.2082	3.8349	3.2679	
	3.8794	3.2942				
7	60.00 (deg):	4.0778	3.3383	4.2108	3.4065	
	4.2692	3.4365				
8	70.00 (deg):	4.5082	3.4958	4.6803	3.5733	
	4.7568	3.6077				
9	80.00 (deg):	5.0816	3.6740	5.3097	3.7611	
	5.4139	3.7999				
10	90.00 (deg):	5.8630	3.8586	6.1792	3.9545	
	6.3300	3.9977				
11	100.00 (deg):	6.8302	4.0354	7.3121	4.1390	
	7.5569	4.1868				

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 = 0.486133		
Focal Length :	-1.000813	1.000813
Focal Planes :	3.204845	-0.007950
Principal Planes :	4.205658	-1.008764
Anti-Principal Planes :	2.204031	0.992863
Nodal Planes :	4.205658	-1.008764
Anti-Nodal Planes :	2.204031	0.992863

W = 0.587562 (Primary)

Focal Length	:	-1.009610	1.009610
Focal Planes	:	3.221044	0.040858
Principal Planes	:	4.230654	-0.968752
Anti-Principal Planes	:	2.211435	1.050467
Nodal Planes	:	4.230654	-0.968752
Anti-Nodal Planes	:	2.211435	1.050467

W = 0.656273

Focal Length	:	-1.014039	1.014039
Focal Planes	:	3.227806	0.061548
Principal Planes	:	4.241844	-0.952491
Anti-Principal Planes	:	2.213767	1.075587
Nodal Planes	:	4.241844	-0.952491
Anti-Nodal Planes	:	2.213767	1.075587

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
Use X-Axis Reference	:	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
Use X-Axis Reference	:	Off
Output Pilot Radius	:	Best Fit

2 STANDARD 1st element

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
Use X-Axis Reference	:	Off
Output Pilot Radius	:	Best Fit

3 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
Use X-Axis Reference	:	Off
Output Pilot Radius	:	Best Fit

4 EVENASPH 2nd element

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
Use X-Axis Reference	:	Off
Output Pilot Radius	:	Best Fit

5 EVENASPH

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
Use X-Axis Reference	:	Off
Output Pilot Radius	:	Best Fit

6 EVENASPH 3rd element

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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
  7 EVENASPH
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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
  STO STANDARD                      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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
  9 EVENASPH                      4th element
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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
  10 EVENASPH
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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
  11 EVENASPH                      5th element
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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
  12 EVENASPH
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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
  13 EVENASPH                      7th element
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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
  14 EVENASPH
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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
  15 STANDARD                      filter
Use Rays To Propagate To Next Surface : Off
Recompute Pilot Beam                  : Off
Do Not Rescale Beam Size Using Ray Data: Off

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Use Angular Spectrum Propagator      : Off
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
    16 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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit
    IMA STANDARD          sensor
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
Use X-Axis Reference                  : Off
Output Pilot Radius                   : Best Fit

```

FILES USED:

```

Zemax File
    C:\Users\Kops Laptop\Dropbox\_KOPS &
Prof\Customers\_Apple\zemax\Matsusaka\12_11_2022 Matsusaka example 19 preferred.zos
Session File
    C:\Users\Kops Laptop\Dropbox\_KOPS &
Prof\Customers\_Apple\zemax\Matsusaka\12_11_2022 Matsusaka example 19 preferred.ZDA
Glass Catalogs
    C:\Users\Kops Laptop\Dropbox\_KOPS & Prof\ZEMAX
_Kessler_Zemax_presentations_zbase\ZEMAX\Glasscat\SCHOTT.AGF
Coating Data
    C:\Users\Kops Laptop\Dropbox\_KOPS & Prof\ZEMAX
_Kessler_Zemax_presentations_zbase\ZEMAX\COATINGS\COATING.DAT
ABg Data
    C:\Users\Kops Laptop\Documents\Zemax\ABG_DATA\ABG_DATA.DAT

```