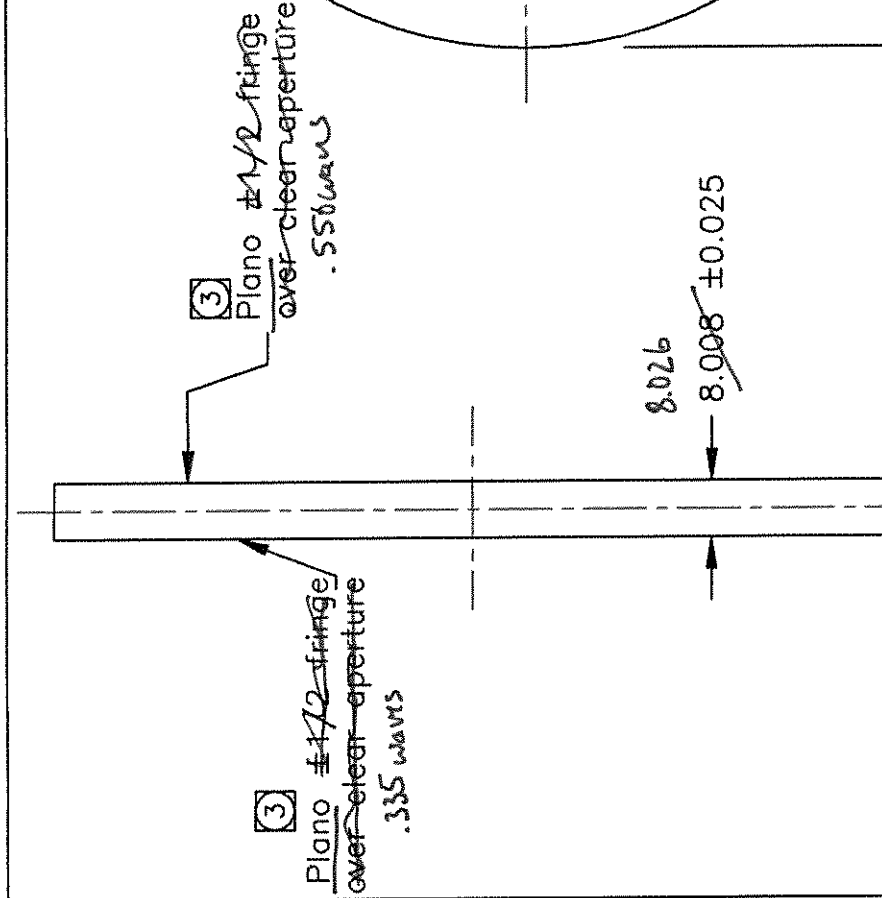
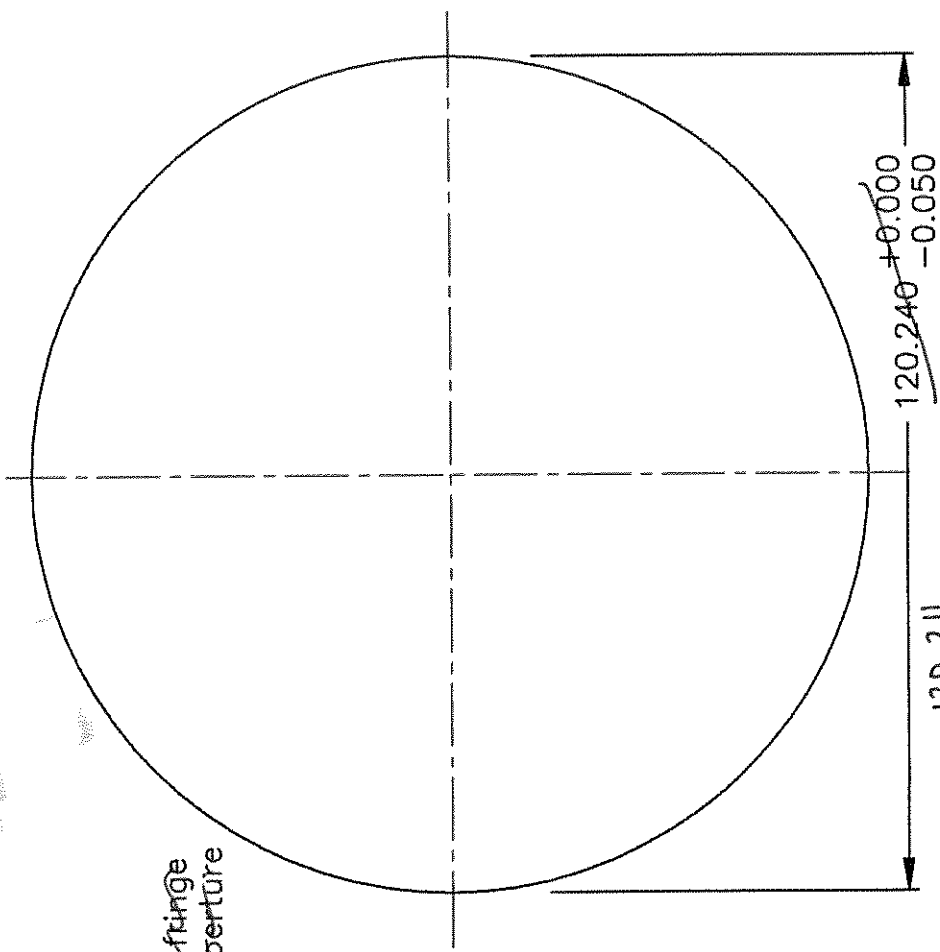


REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION			



**NOTES:**

- 1) Dimensions are in millimeters
- 2) Material:  $\text{CaF}_2$   $n(587.5618\text{nm}) = 1.433849 \pm 0.0005$   
Grain boundary free  
No visible inclusions
- 3) Optical Surfaces:  
Scratch dig 60/40 per MIL-0-13830A  
Micro roughness/finish < 10A rms  
Figure < 16.65nm rms =  $0.0265\lambda$  ( $659\text{nm}$  rms)  $\theta_{\text{inc}} = \theta_{\text{refl}} = 45^\circ$  (A)  
Wedge < 0.012 degrees (TIR 25um)  $\text{Wedge} = 0.037^\circ$  (TIR = 77um)
- 4) Pitch polish to edge
- 5) Chamfer all edges with 0.5mm face width max by 45 degrees
- 6) Clear aperture - 110.0 mm diameter
- 7) Custom transmission/reflection coating for 1.0um to 5.0um  
Coating applied to flattest side as indicated on edge of optic
- 8) Indicate flattest side on edge of optic
- 9) All surface dimensions are at standard Temp & Pressure
- 10) Request inspection report based on final data

DESIGNED BY: R. SARLOT  
 DRAWN BY: R. SARLOT  
 CHECKED BY:  
 APPROVED:  
 APPROVED:  
 APPROVED:  
 JOB NO.  
 CURRENT TIME/DATE/FILE LOCATION:  
 FILE ARCHIVE LOCATION:

DATE: 05/08/98	CATEGORY: ARIES	PROJECT: Dewar Window	PLANT SIZE: A	DRAWING NUMBER: 10446	REVISION: B
PROJECT: Steward Observatory, University of Arizona 933 N. Cherry Avenue, Tucson, AZ 85721 (520)821-7659		TITLE: Circular Plano/Plano Window		REVISION: B	

CONTACT: ROLAND SARLOT 520-626-7252

Part 1 The best one!

Delivered

original window  
(broken)

				INSPECTION DATA		
Customer PO# P254058				WO# 1300-01	PN 4570	Date
Full Quantity 2		Quantity Tested 2		Material CaF2	PN 10446	Lot # 1
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	120.240	+0.000 -0.050	11	Irreg. S1, Fr. or Wv.	16.65 nm rms
2	Width			12	Surface Quality / SD S1	60-40
3	Clear Aperture 1, mm	110.0		13	Radius S2, mm	∅
4	Clear Aperture 2, mm	110.0		14	Power S2, Fr. or Wv.	.25 W
5	SAG 1, mm			15	Irreg. S2, Fr. or Wv.	16.65 nm rms
6	SAG 2, mm			16	Surface Quality / SD S2	60-40
7	Center Thickness, mm	8.008	±0.025	17	TIR, mm	
8	Full Thickness, mm			18	Wedge, mm	.012 deg. (TIR 25 μm)
9	Radius S1, mm	∅		19		
10	Power S1, Fr. or Wv.	.25 W		20		
ACTUAL (MEASURED)						
Part Number						
N	1	2	3	4	5	6
1	120.211	120.217				
2						
3	110.0	110.0				
4	110.0	110.0				
5						
6						
7	8.026	8.014				
8						
9	∅	∅				
10	.335 W	.414 W				
11	.037 W rms	.065 W rms				
12	< 60/40	< 60-40				
13	∅	∅				
14	.556 W	.561 W				
15	.094 W rms	.081 W rms				
16	< 60-40	< 60-40				
17						
18	77 microns	42 microns ← full diameter				
19						
20						
QC Inspector						

+1/4 mirror

				INSPECTION DATA			
Customer PO#		P260564		WO#	1332-02	PN 4554	Date 8-4-00
Full Quantity 2		Quantity Tested 2		Material	Cleartran	10974B	Lot # 1
Parameter		Specifications		Parameter		Specifications	
N		NOM	TOL	N		NOM	TOL
1	Diameter or Length	11.000	+1.000 - .050	11	Irreg. S1, Fr. or Wv.	.0263 $\lambda$	rms
2	Width	—		12	Surface Quality / SD S1	60-40	
3	Clear Aperture 1, mm	9.50		13	Radius S2, mm	$\infty$	
4	Clear Aperture 2, mm	9.50		14	Power S2, Fr. or Wv.	.50 W	
5	SAG 1, mm	$\infty$		15	Irreg. S2, Fr. or Wv.	.0263 $\lambda$	rms
6	SAG 2, mm	$\infty$		16	Surface Quality / SD S2	60-40	
7	Center Thickness, mm	6.500	+/- .100	17	TIR, mm	6 minutes	(19 $\mu$ m)
8	Full Thickness, mm	—		18	Wedge, mm	—	
9	Radius S1, mm	$\infty$		19	45° Flat (mm)	2.00 leg	ref.
10	Power S1, Fr. or Wv.	.50 W		20		—	
				ACTUAL (MEASURED)			
				Part Number			
N	1	2	3	4	5	6	
1	10.98	10.97					
2	—	—					
3	9.5	9.5					
4	9.5	9.5					
5	$\infty$	$\infty$					
6	$\infty$	$\infty$					
7	6.53	6.53					
8	—	—					
9	$\infty$	$\infty$					
10	.016 W	.001 W					
11	.021 $\lambda$ rms	.015 $\lambda$ rms					
12	< 60-40	< 60-40					
13	$\infty$	$\infty$					
14	.083 W	.053 W					
15	.026 $\lambda$ rms	.021 $\lambda$ rms					
16	< 60-40	< 60-40					
17	2.19 (minutes)	6.19 (minutes)					
18	—	—					
19	1.76 @ 45°	1.80 @ 45°					
20	—						
				QC Inspector			

GPI Application  
Surface/Wavefront Map

Z490

8m Aperture

MEASURE  
Analyze  
Mask Data  
Save Data  
Load Data  
Calibrate  
Reset

Analyze Contr.

S/W Profile

Slope Mag

Slope X

Slope Y

DSF

MTF

MTP Profile

Zernikes

ISO 10110-5

SynthPringes

Measure Attr

Analyze Attr

Process

Report

Units

Video Monitor

Z490

Oblique Plot

PV 0.167 wave  
rms 0.021 wave  
Power -0.016 wave  
Size X 9.5 mm  
Size Y 9.5 mm

Removed: PST TLF  
Aperture ID (%):  
Aperture ID (%):  
Trimmed: 0  
Filter: Off

Z490 Measurement Controls

Comment: Focus Channel, Cleartran, Plano, Side 1, Part #1

Part Number: 10974 B  
Min Mod Ect: 7

PO#: P260564  
Avgs: 0

Instrument: Mark GPI Id 0 SN 4624 SB D  
Phase Avgs: 5

Z490 Surface/Wavefront Profile

PV 0.050 wave rms 0.015 wave

Z490 Intensity Map

**Z490** GPI Application  
Surface/Wavefront Map

**5m Aperture** Z490

**MEASURE**  
Analyze  
Mask Data  
Save Data  
Load Data  
Calibrate  
Reset

Analyze Contr

S/W Profile

Slope Mag

Slope X  
Slope Y

PBF  
MTF  
MTF Profile  
Zernikes

ISO 10110-5

SynthFringes

Measure Attr  
Analyze Attr  
Process  
Report  
Units

Video Monitor

**Oblique Plot**

Removed: Pst TLF  
Aperture OD (mm): 85 | Aperture ID (mm): 0  
Trimmed: 0 | Filter: Off

**Measurement Controls**

Comment: Focus Channel, Cleartran, Plano, Side 2, Part #1  
Part Number: 10974 B | Min Mod Pct: 7  
PO#: P260564 | Avgs: 0  
Instrument: Mark GPI Id 0 8N 4624 SB 0 | Phase Avgs: 5

**Surface/Wavefront Profile**

PV 0.133 wave  
RMS 0.026 wave  
Power -0.083 wave  
Size X 9.8 mm  
Size Y 9.8 mm

PV 0.057 wave | RMS 0.016 wave

**Z490 Intensity Map**

*measured prior to flat*

GPI Application

---

8x Aperture

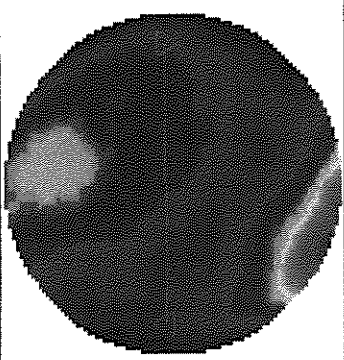
Zygo

Surface/Wavefront Map

Zygo

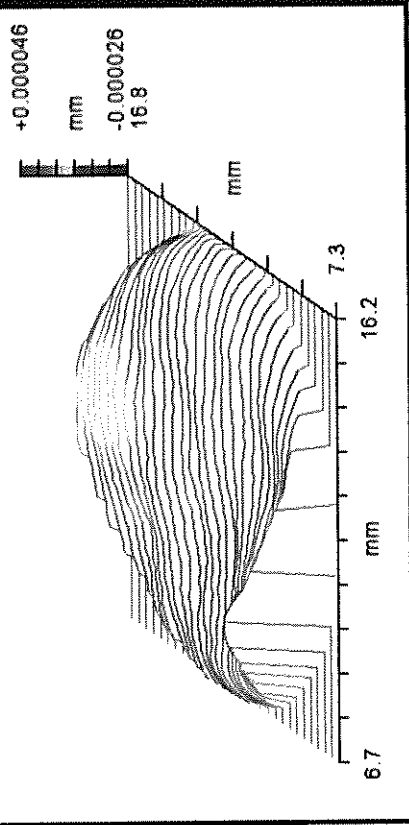
Oblique Plot

Zygo



+0.000046  
mm  
-0.000026

PV	0.113	wave
rms	0.015	wave
Power	-0.001	wave
Size X	9.5	mm
Size Y	9.5	mm



+0.000046  
mm  
-0.000026  
16.8

Analyze Contr

S/N Profile

Slope Mag

Slope X

Slope Y

DBP

MTF

MTF Profile

Zernikes

ISO 10110-5

SynthFringes

Measure Attr

Analyze Attr

Process

Report

Units

Video Monitor

Removed: PST TIT

Aperture ID (%):

Aperture ID (%):

Trimmed: 0

Filter: Off

Measurement Controls

Comment: Focus Channel, Cleartran, Plano, Side 1, Part #2

Part Number: 10974 B

Min. Mod Pct: 7

PO#: P260564

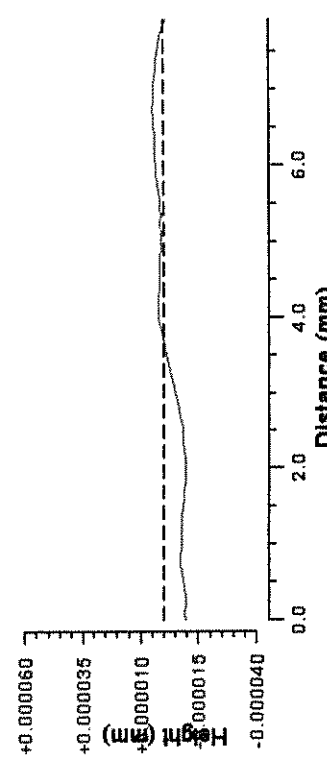
Avg: 0

Instrument: Mark GPI Id 0 SN 4624 SB 0

Phase Avg: 5

Surface/Wavefront Profile

Zygo



+0.000060  
+0.000035  
+0.000010  
-0.000015  
-0.000040

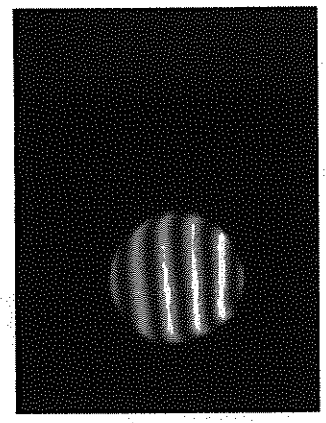
Distance (mm)

0.0 2.0 4.0 6.0

PV 0.022 wave rms 0.008 wave

Intensity Map

Zygo



GPI Application  
Surface/Wavefront Map

Sm Aperture Z490

MEASURE  
Analyze  
Mask Data  
Save Data  
Load Data  
Calibrate  
Reset

Analyze Cntr:

S/W Profile

Slope Mag

Slope X

Slope Y

PEP

MTF

MTV Profile

Zernikes

T80 10110-5

Synthetic

Measure Attr

Analyze Attr

Process

Report

Units

Video Monitor

Oblique Plot

Removed: PST ILY

Aperture OD (%): 0

Trimmed: 0

Filter: Off

Measurement Controls

Comment: Focus Channel, Cleartran, Plano, Side 2, Part #2

Part Number: 10974 B

Min Mod Pct: 7

PO#: F260564

Avg: 0

Instrument: Mark GPI Id 0 SN 4624 SB 0

Phase Avg: 5

Surface/Wavefront Profile

EV 0.132 wave

rms 0.021 wave

Power -0.053 wave

Size X 9.8 mm

Size Y 9.8 mm

EV 0.045 wave

rms 0.010 wave

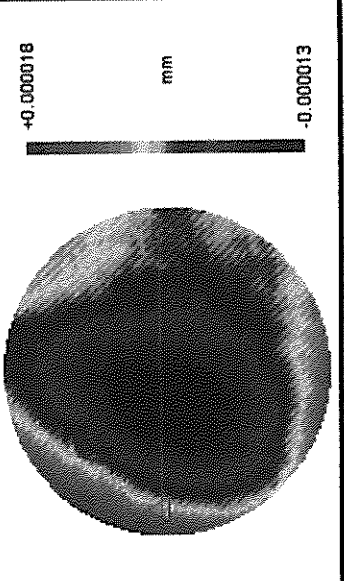
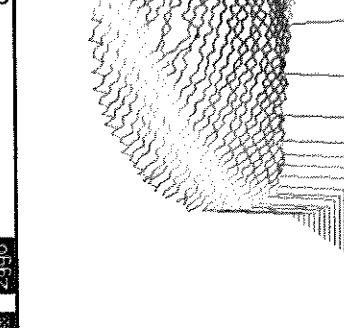
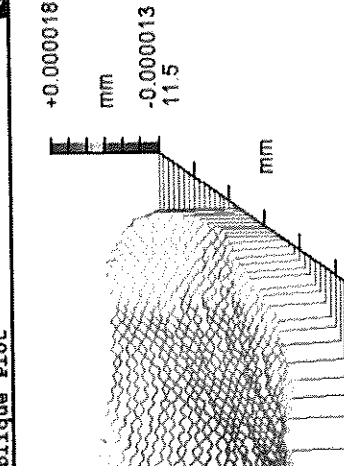
Z490 Intensity Map

*measured prior to flat*

+/+ Mirror

				INSPECTION DATA		
Customer PO#		P260564		WO# 1332-01	PN 4553	Date 8-4-00
Full Quantity 1		Quantity Tested 1		Material Fused Silica	10970A	Lot # 1
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	11.000	+1.000 -1.050	11	Irreg. S1, Fr. or Wv.	.0263 λ rms
2	Width	—		12	Surface Quality / SD S1	60-40
3	Clear Aperture 1, mm	9.50		13	Radius S2, mm	∞
4	Clear Aperture 2, mm	9.50		14	Power S2, Fr. or Wv.	.50 W
5	SAG 1, mm	∞		15	Irreg. S2, Fr. or Wv.	.0263 λ rms
6	SAG 2, mm	∞		16	Surface Quality / SD S2	60-40
7	Center Thickness, mm	5.000	+/- .200	17	TIR, mm	6 minutes (19 μm)
8	Full Thickness, mm	—		18	Wedge, mm	—
9	Radius S1, mm	∞		19		—
10	Power S1, Fr. or Wv.	.50 W		20		—
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	10.98					
2	—					
3	9.50					
4	9.50					
5	∞					
6	∞					
7	5.00					
8	—					
9	∞					
10	.027 W					
11	.009 λ rms					
12	< 60-40					
13	∞					
14	.043 W					
15	.014 λ rms					
16	< 60-40					
17	3.85' (minutes)					
18	—					
19	—					
20	—					
				QC Inspector		





MEASURE  
Analyze  
Mask Data  
Save Data  
Load Data  
Calibrate  
Reset

Analyze Cntr

8/W Profile

Slope Mag

Slope X

Slope Y

PBF

WFF

ATF Profile

Zernikes

ISO 10110-5

SynthFringes

Measure Attr

Analyze Attr

ProceBE

Report

Units

Video Monitor

PV 0.049 wave  
RMS 0.009 wave  
Power 0.027 wave  
Size X 9.8 mm  
Size Y 9.8 mm

Removed: P87 TLR  
Aperture OD (%): 86  
Aperture ID (%): 0  
Trimmed: 0  
Filter: Off

Measurement Controls

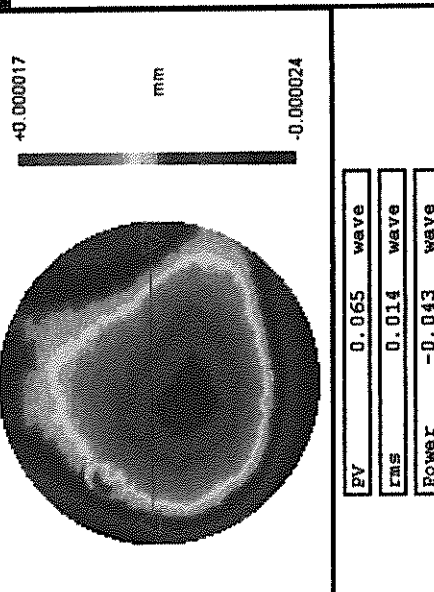
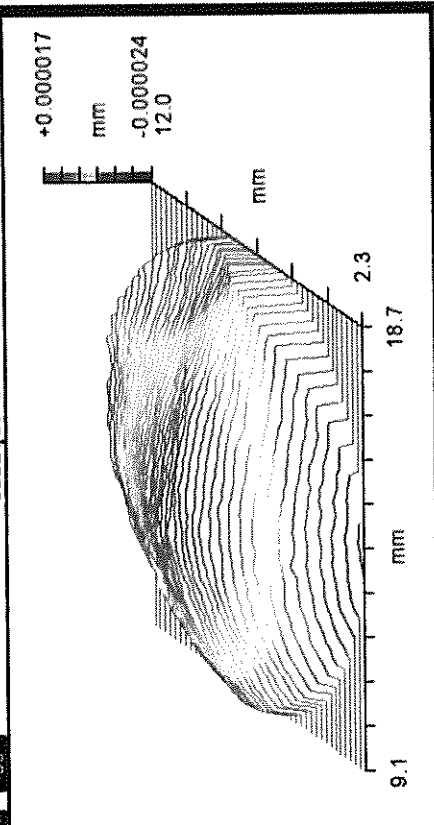
Comment: Fold Flat Mirror, Fused Silica, Plano Side 1  
Part Number: 10970 A  
Min Mod Pct: 7  
PO# R260564  
Avgs: 0  
Phase Avgs: 5  
Instrument: Mark GPI Id 0 SN 4624 SB 0

Z490 Surface/Wavefront Profile

PV 0.027 wave  
RMS 0.008 wave

Z490 Surface/Wavefront Map

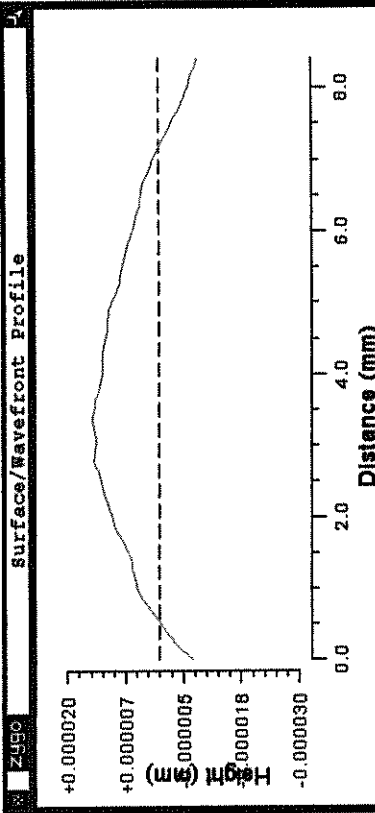
8m Aperture Z490 Z490 Oblique Plot



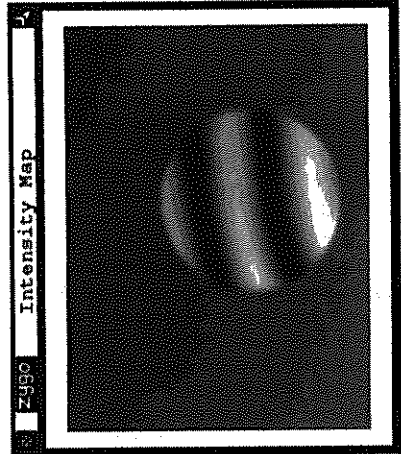
PV 0.065 wave  
 rms 0.014 wave  
 Power -0.043 wave  
 Size X 9.6 mm  
 Size Y 9.6 mm

Removed: EST TLN  
 Aperture ID (%): 0  
 Trimmed: 0  
 Filter: Off

Measurement Controls  
 Comment: Fold Flat Mirror, Fused Silica, Plano Side 2  
 Part Number: 10970 A Min Mod Pct: 7  
 PO# P260564 Avgs: 0  
 Instrument: Mark GPI id 0 9N 4624 SB 0 Phase Avgs: 5



PV 0.036 wave rms 0.010 wave



- MEASURE
- Analyze
- Mask Data
- Save Data
- Load Data
- Calibrate
- Reset

Analyze Cntr

S/W Profile

Slope Mag

Slope X

Slope Y

DBP

MTF

MTF Profile

Zernikes

T80 10110-5

Synthetic

Measure Attr

Analyze Attr

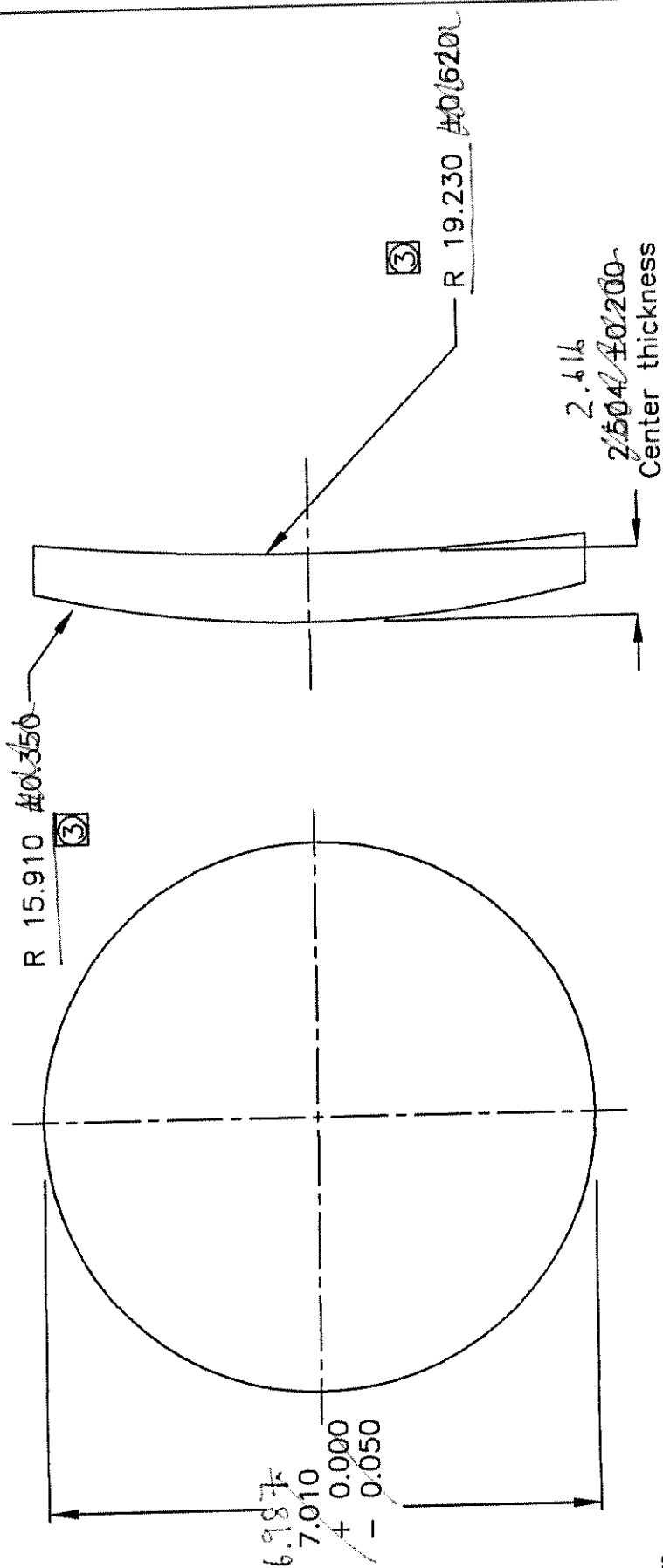
Process

Report

Units

Video Monitor

REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION			



- NOTES:
- 1) Dimensions are in millimeters
  - 2) Material: Schott SF6  $n(587.5618\text{nm})=1.805180 \pm 0.0005$   
Grade 2, B1  
"Normal Quality" striae
  - 3) Optical Surfaces:  
Scratch dig 60/40 per MIL-O-13830A  
Micro roughness/finish <20A rms  
Figure <16.65nm rms (0.0263 waves rms @ 632.8nm)  
Wedge < 0.100 degrees (TIR 12 $\mu$ m)
  - 4) Pitch polish to edge
  - 5) Chamfer all edges by 45 degrees
  - 6) Clear aperture - 6.0 mm
  - 7) High transmission coating for 1.0 $\mu$ m to 2.5 $\mu$ m -Not yet specified  
Must withstand 77K operating temperature
  - 8) All surface dimensions are at standard Temp & Pressure
  - 9) Radii are fit to vendor's test plates.
  - 10) Request inspection report based on final data.

*As per drawing*

CONTACT: ROLAND SARLOT 520-626-7252

Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659

DESIGNED BY: R. SARLOT	DATE: 9/3/99	OWNED BY: M. Montoya	12/15/99	PROJECT: ARIES
CHECKED BY:				TITLE: Collimating Lens #1
APPROVED: D. McCarthy	1/19/00			
APPROVED:				
APPROVED:				
JOB NO.		PLAT SIZE: A	SCALE: None	DRAWING NUMBER: 10967
				REVISION: A

UNLESS OTHERWISE SPECIFIED:  
TOLERANCES OR:  
DECIMALS FRACTIONS ANGLES  
JOCK JOCK  
AS NOTED  
DIMENSIONS ARE IN:  
ENGLISH METRIC  
MATERIAL  
FINISH

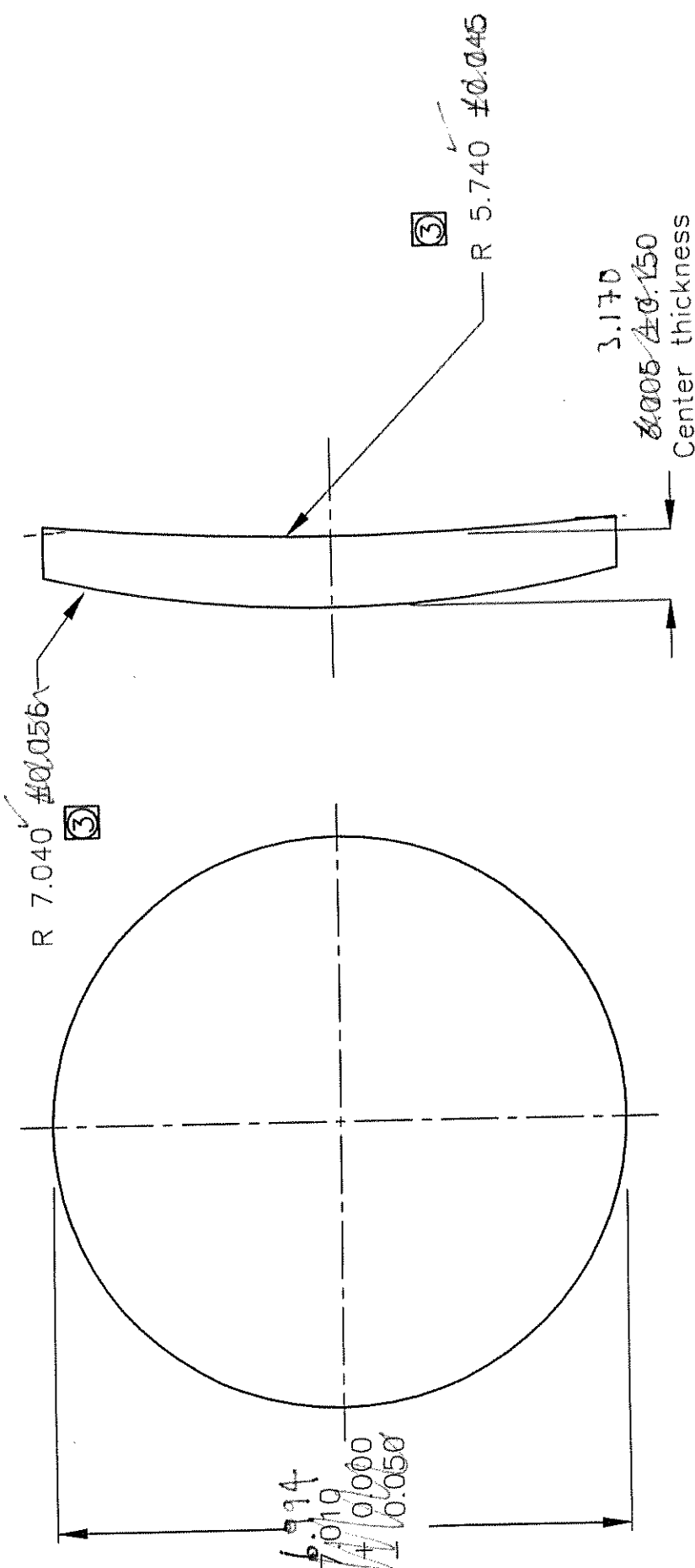
CURRENT FILE/DATE/FILE LOCATION: E:\steward\ARIES\PART 04\23708 11:18  
FILE ARCHIVE LOCATION:

# Collimating Lens 1

# IR Guided

				INSPECTION DATA			
Customer PO# <i>P259392</i>				WO# <i>1331-01</i>	PN <i>4544</i>	Date <i>8-1-00</i>	
Full Quantity <i>1</i>	Quantity Tested <i>1</i>			Material <i>SF-6</i>	<i>10967A</i>	Lot # <i>1</i>	
Parameter		Specifications		Parameter		Specifications	
N		NOM	TOL	N	NOM	TOL	
1	Diameter or Length	<i>7.010</i>	<i>+0.000 -0.050</i>	11	Irreg. S1, Fr. or Wv.	<i>.0263 λ</i>	<i>rms</i>
2	Width	<i>—</i>		12	Surface Quality / SD S1	<i>60-40</i>	
3	Clear Aperture 1, mm	<i>6.0</i>		13	Radius S2, mm (CC)	<i>19.230</i>	<i>H-.620</i>
4	Clear Aperture 2, mm	<i>6.0</i>		14	Power S2, Fr. or Wv.	<i>—</i>	
5	SAG 1, mm	<i>.391</i>		15	Irreg. S2, Fr. or Wv.	<i>.0263 λ</i>	<i>rms</i>
6	SAG 2, mm	<i>.322</i>		16	Surface Quality / SD S2	<i>60-40</i>	
7	Center Thickness, mm	<i>2.504</i>	<i>+/- .200</i>	17	TIR, mm	<i>6 minutes</i>	<i>(12 μm)</i>
8	Full Thickness, mm	<i>—</i>		18	Wedge, mm	<i>—</i>	
9	Radius S1, mm (CX)	<i>15.910</i>	<i>+/- .350</i>	19		<i>—</i>	
10	Power S1, Fr. or Wv.	<i>—</i>		20		<i>—</i>	
				ACTUAL (MEASURED)			
				Part Number			
N	1	2	3	4	5	6	
1	<i>6.987</i>						
2	<i>—</i>						
3	<i>6.0</i>						
4	<i>6.0</i>						
5	<i>.391</i>						
6	<i>.322</i>						
7	<i>2.616</i>						
8	<i>—</i>						
9	<i>15.910 (CX)</i>						
10	<i>—</i>						
11	<i>&lt;.0263 λ rms</i>						
12	<i>&lt; 60-40</i>						
13	<i>19.230 (CC)</i>						
14	<i>—</i>						
15	<i>&lt;.0263 λ rms</i>						
16	<i>&lt; 60-40</i>						
17	<i>1.05' (2.1 μm)</i>						
18	<i>—</i>						
19	<i>—</i>						
20	<i>—</i>						
<i>N points towards</i>			<i>15.910 ROC</i>	<i>surface</i>			
				QC Inspector			

REVISIONS	DATE	REVISED BY	APPROVED
LTR			
DESCRIPTION			



CONTACT: ROLAND SARLOT 520-626-7252

Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659

DESIGNED BY: R. SARLOT DATE: 9/3/99  
 CHECKED BY: M. Montoya DATE: 12/15/99  
 APPROVED BY: D. McCarthy DATE: 1/20/00

PROJECT: ARIES  
 TITLE: Collimating Lens #2

OUTGOING: IR Guide Star-Dual Channel  
 DRAWING NUMBER: 10968

PLAT SIZE: A SCALE: None

JOB NO. ACTIVITY CODE: FINISH: 2

CURRENT TIME/DATE/FILE LOCATION: E:\Dimension\Aries\9471\_06/23/98 11:18  
 FILE ARCHIVE LOCATION:

UNLESS OTHERWISE SPECIFIED	DECIMALS	FRACTIONS	ANGLES
TOLERANCES ON:	XX	AS NOTED	
JOG			
AS			
DIMENSIONS ARE IN:	ENGLISH	METRIC	X
MATERIAL			

- NOTES:
- Dimensions are in millimeters
  - Material: Barium Fluoride  $n(587.5618\text{nm})=1.474478 \pm 0.0005$   
 Grain boundary free  
 No visible inclusions
  - Optical Surfaces:  
 Scratch dig 60/40 per MIL-0-13830A  
 Micro roughness/finish <20A rms  
 Figure <16.65nm rms (0.0263 waves rms @ 632.8nm)  
 Wedge < 0.100 degrees (TIR 12µm)
  - Pitch polish to edge
  - Chamfer all edges by 45 degrees
  - Clear aperture - 6.0 mm
  - High transmission coating for 1.0um to 2.5um - Not yet specified  
 Must withstand 77K operating temperature
  - All surface dimensions are at standard Temp & Pressure
  - Radii are fit to vendor's test plates.
  - Request inspection report based on final data.

*Handwritten signature*

# Collimator 2

				INSPECTION DATA		
Customer PO# <i>P259392</i>				WO# <i>1331-02</i>	PN <i>4545</i>	Date <i>8-1-00</i>
Full Quantity <i>1</i>	Quantity Tested <i>1</i>			Material <i>B<sub>2</sub>F<sub>2</sub></i>	<i>10968 B</i>	Lot # <i>1</i>
Parameter	Specifications			Parameter	Specifications	
N	NOM	TOL	N	NOM	TOL	
1	Diameter or Length	<i>7.010</i>	<i>+ .000</i> <i>- .050</i>	11	Irreg. S1, Fr. or Wv.	<i>.0263 λ rms</i>
2	Width	<i>—</i>		12	Surface Quality / SD S1	<i>60-40</i>
3	Clear Aperture 1, mm	<i>5.0</i>		13	Radius S2, mm (CC)	<i>5.740 ± .045</i>
4	Clear Aperture 2, mm	<i>4.3</i>		14	Power S2, Fr. or Wv.	<i>—</i>
5	SAG 1, mm	<i>.935</i>		15	Irreg. S2, Fr. or Wv.	<i>.0263 λ rms</i>
6	SAG 2, mm	<i>1.195</i>		16	Surface Quality / SD S2	<i>60-40</i>
7	Center Thickness, mm	<i>3.005</i>	<i>± .150</i>	17	TIR, mm	<i>6' minutes (12 μm)</i>
8	Full Thickness, mm	<i>—</i>		18	Wedge, mm	<i>—</i>
9	Radius S1, mm (CX)	<i>7.040</i>	<i>± .056</i>	19	ID (CC)	<i>&gt; 5.01</i>
10	Power S1, Fr. or Wv.	<i>—</i>		20	Flat (CC)	<i>&lt; 1 mm</i>
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	<i>6.994</i>					
2	<i>—</i>					
3	<i>5.0</i>					
4	<i>4.3</i>					
5	<i>.935</i>					
6	<i>1.195</i>					
7	<i>3.17</i>					
8	<i>—</i>					
9	<i>7.040 (CX)</i>					
10	<i>—</i>					
11	<i>&lt; .0263 λ rms</i>					
12	<i>&lt; 60-40</i>					
13	<i>5.740 (CC)</i>					
14	<i>—</i>					
15	<i>&lt; .0263 λ rms</i>					
16	<i>&lt; 60-40</i>					
17	<i>8.99' (18 μm)</i>					
18	<i>—</i>					
19	<i>5.691</i>					
20	<i>.651</i>					
				<i>Λ points towards 7.040 ROC surface</i>		
				QC Inspector		

				INSPECTION DATA			
Customer PO# <i>P259392</i>				WO# <i>1331-03</i>	PN <i>4546</i>	Date <i>8-1-00</i>	
Full Quantity <i>1</i>	Quantity Tested <i>1</i>			Material <i>Fused Silica</i>	<i>10969A</i>	Lot # <i>1</i>	
Parameter		Specifications		Parameter		Specifications	
N		NOM	TOL	N		NOM	TOL
1	Diameter or Length	<i>12.200</i>	<i>+1.000 -1.050</i>	11	Irreg. S1, Fr. or Wv.	<i>.0263 λ rms</i>	
2	Width	<i>—</i>		12	Surface Quality / SD S1	<i>&lt; 60-40</i>	
3	Clear Aperture 1, mm	<i>6.0</i>		13	Radius S2, mm	<i>∞</i>	
4	Clear Aperture 2, mm	<i>6.0</i>		14	Power S2, Fr. or Wv.	<i>1 Fr.</i>	
5	SAG 1, mm	<i>∞</i>		15	Irreg. S2, Fr. or Wv.	<i>.0263 λ rms</i>	
6	SAG 2, mm	<i>∞</i>		16	Surface Quality / SD S2	<i>&lt; 60-40</i>	
7	Center Thickness, mm	<i>1.000</i>	<i>+/- .200</i>	17	TIR, mm	<i>12 minutes (24 μm)</i>	
8	Full Thickness, mm	<i>—</i>		18	Wedge, mm	<i>—</i>	
9	Radius S1, mm	<i>∞</i>		19		<i>—</i>	
10	Power S1, Fr. or Wv.	<i>1 Fr.</i>		20		<i>—</i>	
				ACTUAL (MEASURED)			
				Part Number			
N	1	2	3	4	5	6	
1							
2	<i>—</i>						
3	<i>6.0</i>						
4	<i>6.0</i>						
5	<i>∞</i>						
6	<i>∞</i>						
7							
8	<i>—</i>						
9	<i>∞</i>						
10							
11							
12	<i>&lt; 60-40</i>						
13	<i>∞</i>						
14							
15							
16	<i>&lt; 60-40</i>						
17							
18	<i>—</i>						
19	<i>—</i>						
20	<i>—</i>						
				QC Inspector			

# Cutoff Filter

# IR Guide

				INSPECTION DATA		
Customer PO# <i>P259392</i>				WO# <i>1331-03</i>	PN <i>4546</i>	Date <i>8-1-00</i>
Full Quantity <i>2</i>		Quantity Tested	<i>2</i>	Material <i>Fused Silica</i>	<i>10969A</i>	Lot # <i>1</i>
Parameter	Specifications			Parameter	Specifications	
N	NOM	TOL	N	NOM	TOL	
1	Diameter or Length	<i>12.200</i>	<i>±.000</i> <i>-.050</i>	11	Irreg. S1, Fr. or Wv.	<i>.0263 λ rms</i>
2	Width	<i>—</i>		12	Surface Quality / SD S1	<i>&lt;60-40</i>
3	Clear Aperture 1, mm	<i>6.0</i>		13	Radius S2, mm	<i>∞</i>
4	Clear Aperture 2, mm	<i>6.0</i>		14	Power S2, Fr. or Wv.	<i>.50</i>
5	SAG 1, mm	<i>∞</i>		15	Irreg. S2, Fr. or Wv.	<i>.0263 λ rms</i>
6	SAG 2, mm	<i>∞</i>		16	Surface Quality / SD S2	<i>&lt;60-40</i>
7	Center Thickness, mm	<i>1.000</i>	<i>+/- .200</i>	17	TIR, mm	<i>12 minutes (24 μm)</i>
8	Full Thickness, mm	<i>—</i>		18	Wedge, mm	<i>—</i>
9	Radius S1, mm	<i>∞</i>		19		
10	Power S1, Fr. or Wv.	<i>.50</i>		20		
				ACTUAL (MEASURED)		
				Part Number		
N	<i>1</i>	<i>2</i>	<i>4</i>	<i>5</i>	<i>6</i>	
1	<i>12.20</i>	<i>12.16</i>				
2	<i>—</i>	<i>—</i>				
3	<i>6.0</i>	<i>6.0</i>				
4	<i>6.0</i>	<i>6.0</i>				
5	<i>∞</i>	<i>∞</i>				
6	<i>∞</i>	<i>∞</i>				
7	<i>.85</i>	<i>.84</i>				
8	<i>—</i>	<i>—</i>				
9	<i>∞</i>	<i>∞</i>				
10	<i>.001</i>	<i>.000</i>				
11	<i>.008 λ rms</i>	<i>.007 λ rms</i>				
12	<i>&lt;60-40</i>	<i>&lt;60-40</i>				
13	<i>∞</i>	<i>∞</i>				
14	<i>.067</i>	<i>.037</i>				
15	<i>.021 λ rms</i>	<i>.011 λ rms</i>				
16	<i>&lt;60-40</i>	<i>&lt;60-40</i>				
17	<i>.44 minutes</i>	<i>2.64 minutes</i>				
18	<i>—</i>	<i>—</i>				
19						
20						
				QC Inspector		



5m Aperture

Z490

Oblique Plot

Removed: PST TLT

Aperture ID (%): 0

Aperture ID (%): 50

Trimmed: 0

Filter: Off

5m Aperture

Z490

Intensity Map

Removed: PST TLT

Aperture ID (%): 0

Aperture ID (%): 50

Trimmed: 0

Filter: Off

Measurement Controls

Z490

Comment: IR Guide Star, FS Cutoff Filter, Side 1, Part#1

Part Number: 10969A

Min Mod Pct: 7

PO#: F259392

Avg: 0

Instrument: Mark GPI Id 0 SN 4624 SB 0

Phase Avgs: 5

Surface/Wavefront Profile

Z490

PV 0.013 wave

rms 0.004 wave

- MEASURE
- Analyze
- Mask Data
- Save Data
- Load Data
- Calibrate
- Reset

Analyze Cntrl

S/W Profile

Slope Mag

Slope X

Slope Y

PBF

MTF

MTP Profile

Ternikes

ISO 10110-5

Synthesizing

Measure Attr

Analyze Attr

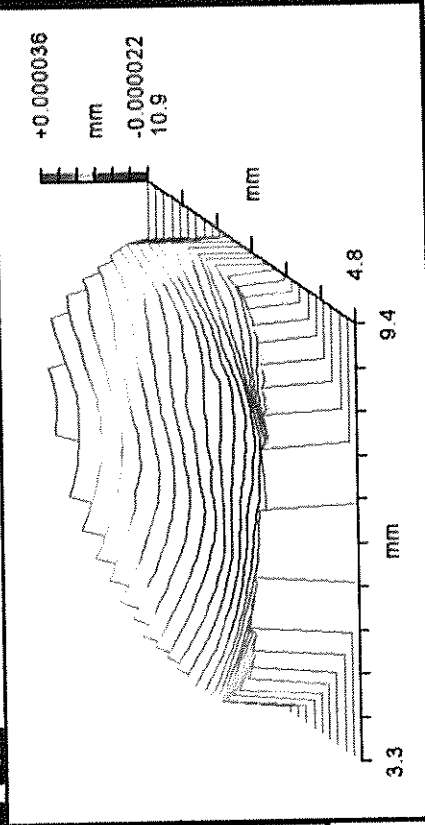
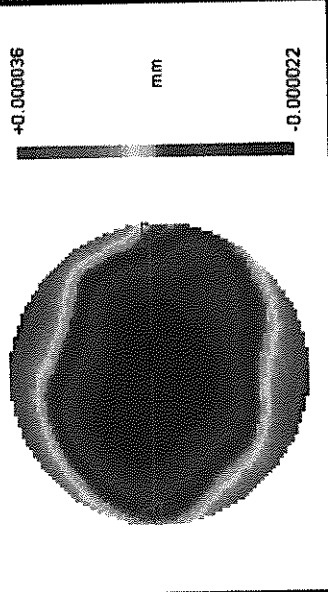
Process

Report

Units

Video Monitor

- 8m Aperture
- MEASURE
- Analyze
- Mask Data
- Save Data
- Load Data
- Calibrate
- Reset



Analyze Cntr

PV 0.092 wave  
 rms 0.021 wave  
 Power 0.067 wave  
 Size X 6.1 mm  
 Size Y 6.1 mm

S/W Profile

Slope Mag  
 Slope X  
 Slope Y

DSF  
 MTF

MTF Profile  
 Cornikes

RISO 10110-5

SynthPringes

Measure Attr  
 Analyze Attr

Process  
 Report

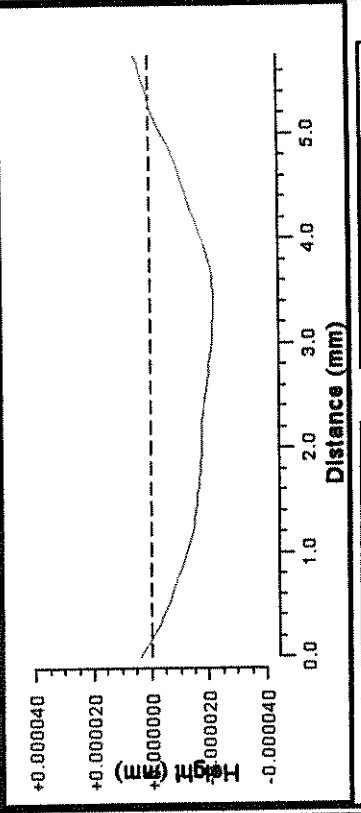
Units

Video Monitor

Removed: PST TLF  
 Aperture OD (%): 50 Aperture ID (%): 0  
 Trimmed: 0  
 Filter: Off

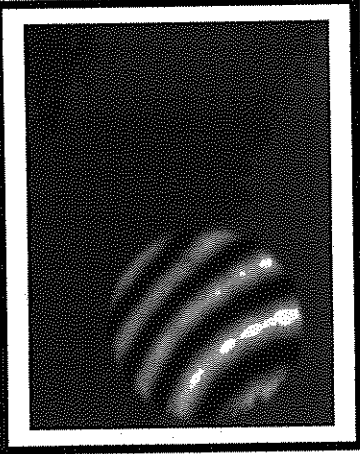
Measurement Controls  
 Comment: IR Guide Star, FS Cutoff Filter, Side 2, Part#1  
 Part Number: 10969A Min Mod Pct: 7  
 PO#: P259392 Avgs: 0  
 Instrument: Mark GPI Id 0 SN 4624 SB 0 Phase Avgs: 5

Z490 Surface/Wavefront Profile



PV 0.042 wave rms 0.013 wave

Z490 Intensity Map



Sm Aperture Z490 Oblique Plot

MEASURE

Analyze

Mask Data

Save Data

Load Data

Calibrate

Reset

Analyze Cntr

B/W Profile

Slope Mag

Slope X

Slope Y

DBF

MTF

MTF Profile

Zernikes

ISO 10110-5

SynthFringes

Measure Attr

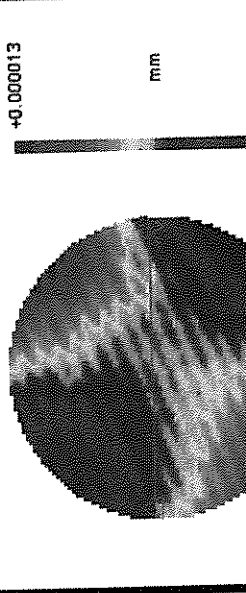
Analyze Attr

Process

Report

Units

Video Monitor



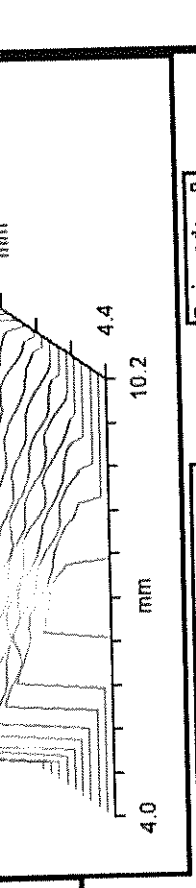
FV 0.042 wave

RMS 0.007 wave

Power 0.000 wave

Size X 6.1 mm

Size Y 6.1 mm



Removed: PST Filter

Aperture OD (%): 50

Aperture ID (%): 0

Trimmed: 0

Filter: Off

Measurement Controls

Z490

Comment: IR Guide Star, F8 Cutoff Filter, Side 1, Part#2

Part Number: 10969A

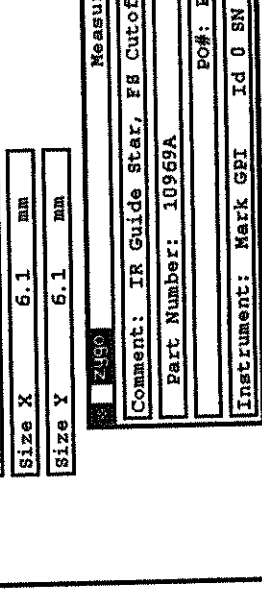
Min Mod Rct: 7

PO#: P259392

Avg: 0

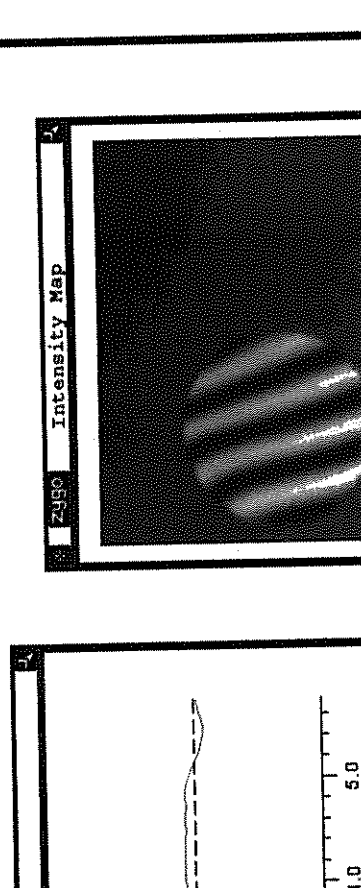
Instrument: Mark GPI Id 0 SN 4624 SB 0

Phase Avgs: 5



FV 0.007 wave

RMS 0.002 wave



Z490 Intensity Map

**GPI Application**

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Sm Aperture

MEASURE

Analyze

Mask Data

Save Data

Load Data

Calibrate

Reset

Analyze Ctrl

S/W Profile

Slope Mag

Slope X

Slope Y

PSE

MTF

MTF Profile

Zernikes

ISO 10110-5

Synthetic Fringes

Measure Atti

Analyze Atti

Process

Report

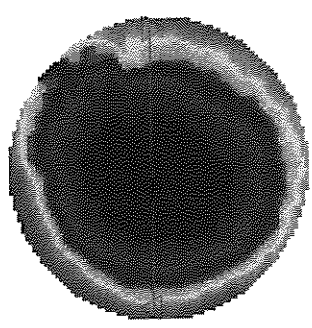
Units

Video Monitor

Surface/Wavefront Map

Oblique Plot

---

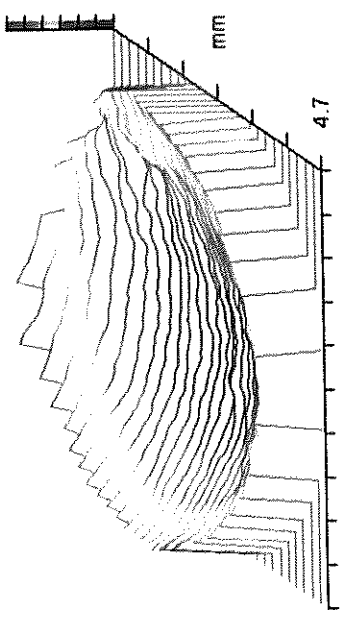


mm

+0.000020

-0.000012

PV	0.051	wave
rms	0.011	wave
Power	0.037	wave
Size X	6.1	mm
Size Y	6.1	mm



mm

+0.000020

-0.000012

10.9

---

Removed: PST FLT

Aperture OD (%): 50

Aperture ID (%): 0

Trimmed: 0

Filter: Off

Measurement Controls

Comment: IR Guide Star, FS Cutoff Filter, Side 2, Part#2

Part Number: 10969A

Min Mod Pct: 7

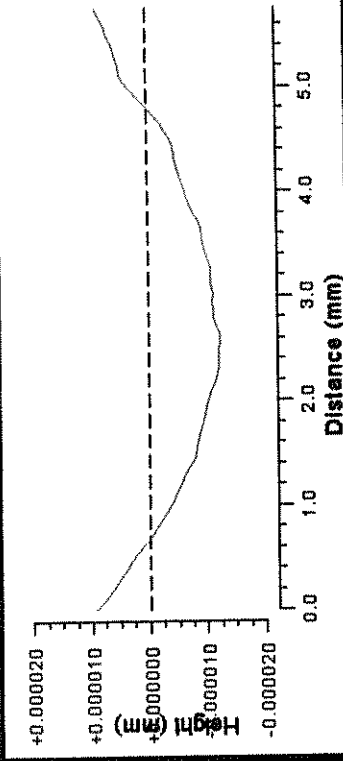
PO#: E259392

Avg: 0

Instrument: Mark GPI Id 0 SN 4624 SB 0

Phase Avgs: 5

---



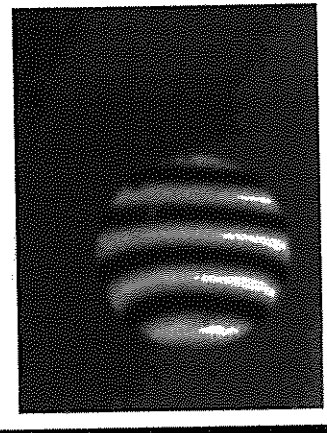
Height (μm)

Distance (mm)

PV 0.034 wave

rms 0.011 wave

---

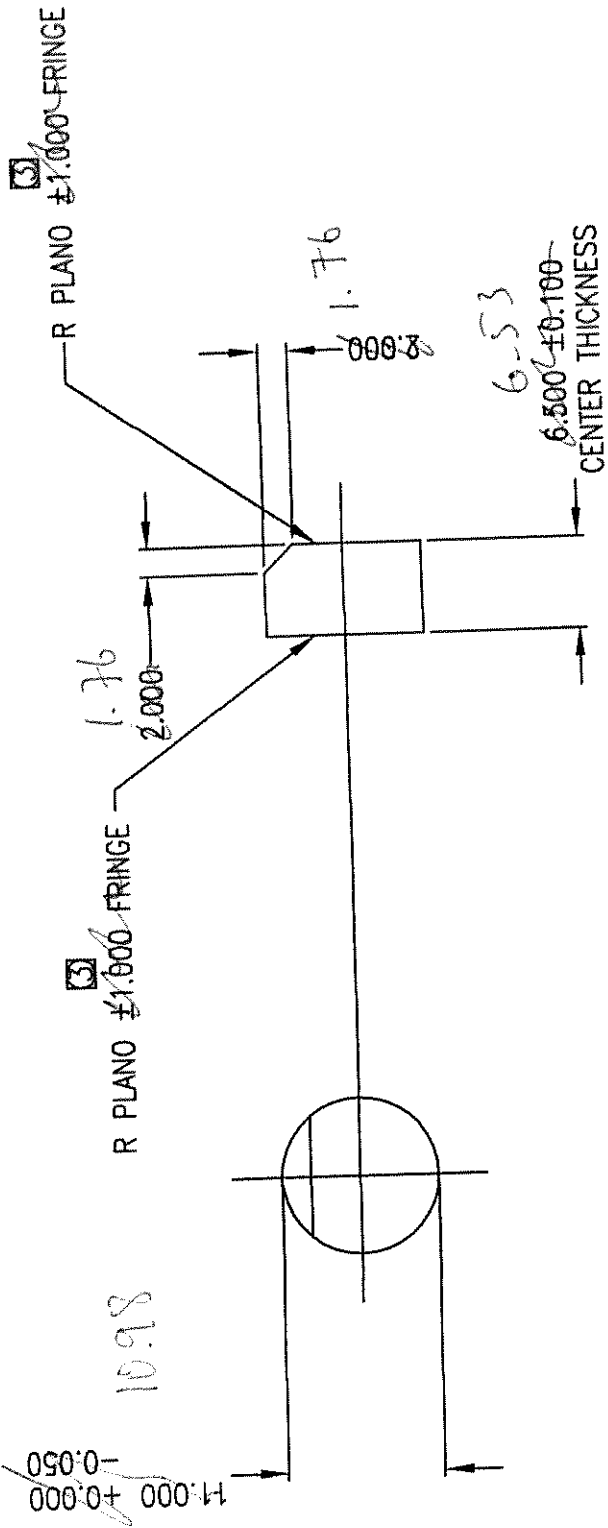


Intensity Map

PV 0.034 wave

rms 0.011 wave

REVISIONS		
LTR	DESCRIPTION	DATE
A	Material from ZnSe to ZnS and Title	4/99
		R. Sarlot



- NOTES:
- Dimensions are in millimeters
  - Material: Cleartran (CYD Zinc Sulfide)  $n(587.5618\text{nm})=2.36789 \pm 0.0005$   
Grain boundary free  
No visible inclusions
  - Optical Surfaces:  
Scratch dig 60/40 per MIL-0-13830A  
Micro roughness/finish <20A rms  
Figure <16.65nm rms (0.0263 waves rms @ 632.8nm)  
Wedge < 0.100 degrees (TIR 19um)
  - Pitch polish to edge
  - Chamfer all edges with 0.5mm face width max by 45 degrees
  - Clear aperture - 9.5 mm
  - High transmission coating for 1.0um to 2.5um - Not yet specified  
Must withstand 77K operating temperature
  - All surface dimensions are at standard Temp & Pressure
  - Radii are fit to vendor's test plates.
  - Request inspection report based on final data.

*Delivered*

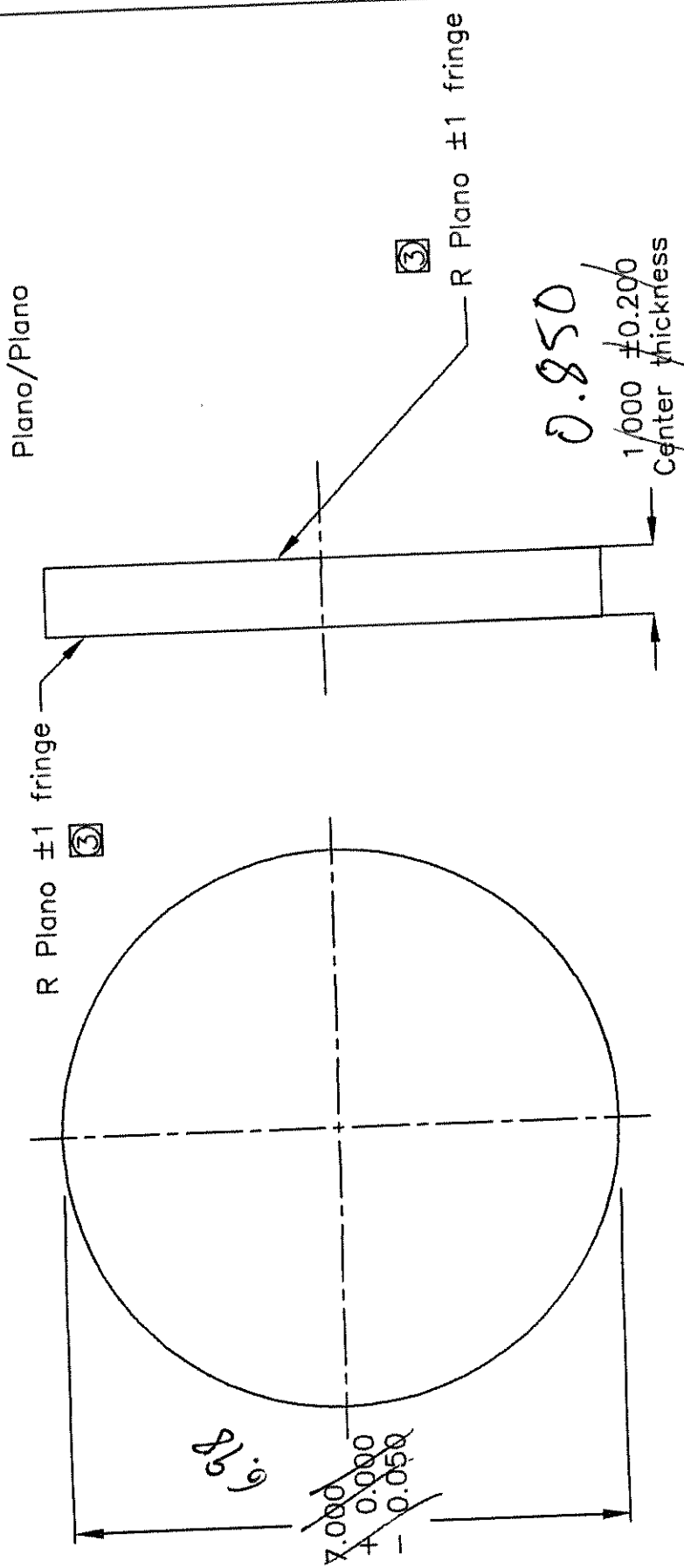
CONTACT: ROLAND SARLOT 520-526-7252

Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7859

DESIGNED BY: R. SARLOT	DATE: 9/3/99	CATEGORY: IR Guide Star-Focus Channel
DRAWN BY: M. Montoya	12/15/99	PROJECT: ARIES
CHECKED BY:		TITLE: Astigmatism Inducing Plate
APPROVED:		
APPROVED:		
APPROVED:		
JOB NO.	ACTIVITY CODE	PLAT SIZE
		None
		10974
		B
CURRENT TIME/DATE/FILE LOCATION: E:\Automation\ARIES\471 06/23/98 11:18		
FILE ARCHIVE LOCATION:		

UNLESS OTHERWISE SPECIFIED	
TOLERANCES ON:	
DECIMALS	FRACTIONS
ANGLES	
XX	
AS NOTED	
DIMENSIONS ARE IN:	
ENGLISH - METRIC - X	
MATERIAL	
2	
FINISH	

REVISIONS		DATE	RELEASED BY	APPROVED
LTR	DESCRIPTION			
B	Diameter change	9/6/00	Sariot	



- NOTES:
- Dimensions are in millimeters
  - Material: Fused Silica  
 $n(587.5618\text{nm}) = 1.45846 \pm 0.0005$   
 Grain boundary free  
 No visible inclusions
  - Optical Surfaces:  
 Scratch dig 60/40 per MIL-0-13830A  
 Micro roughness/finish <20A rms  
 Figure <16.65nm rms (0.0263 waves rms @ 632.8nm)  
 Wedge < 0.200 degrees (TIR 24 $\mu$ m)
  - Pitch polish to edge
  - Chamfer all edges by 45 degrees
  - Clear aperture - 6.0 mm
  - High transmission coating for 1.0um to 2.5um - Not yet specified  
 Must withstand 77K operating temperature
  - All surface dimensions are at standard Temp & Pressure
  - Radii are fit to vendor's test plates.
  - Request inspection report based on final data.

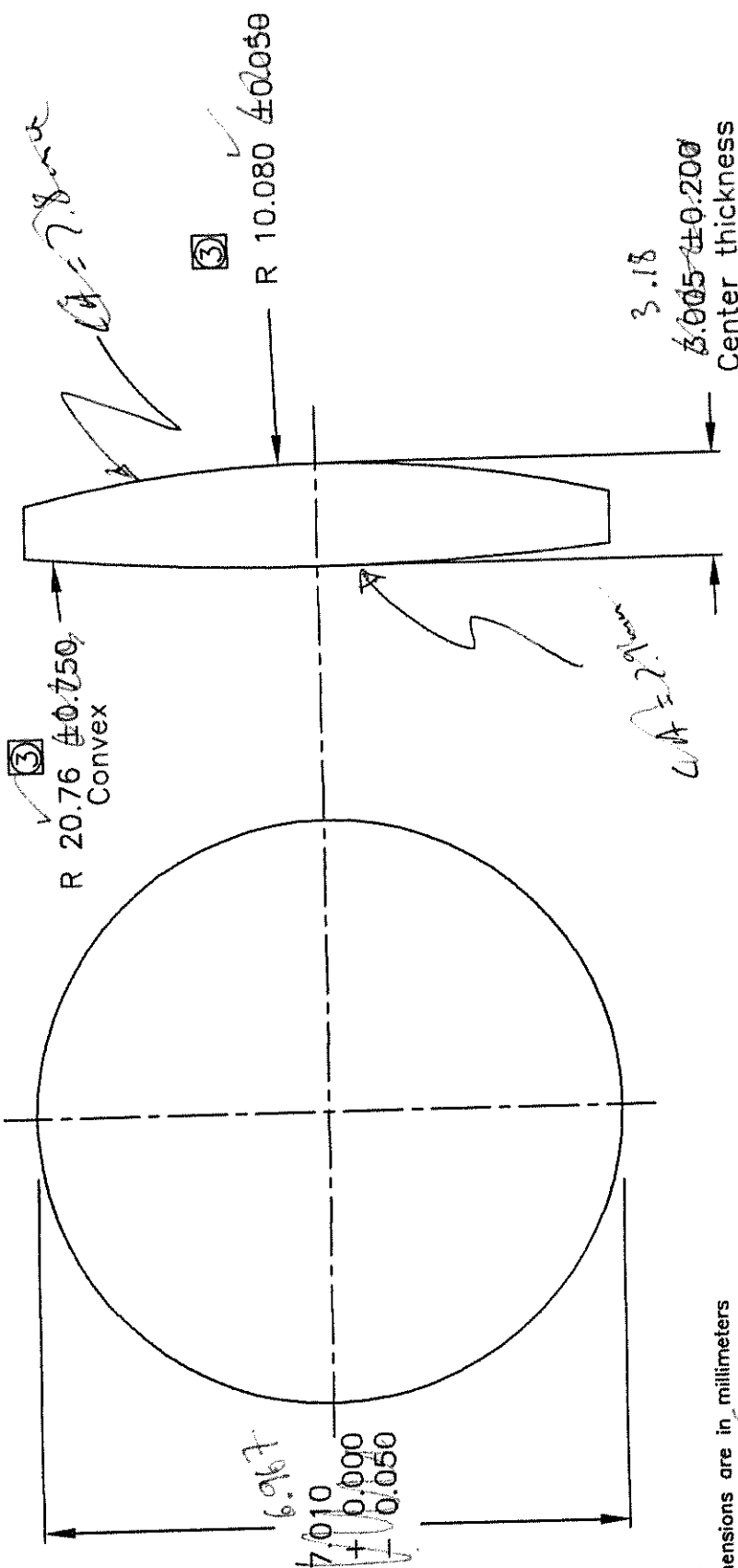
*AB Delivered*

CONTACT: ROLAND SARLOT 520-626-7252  
 Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)821-7659  
 DRAWN BY: R. SARLOT DATE: 9/3/99 PROJECT: ARIES  
 CHECKED BY: M. Moritaya TITLE: Cutoff Filter  
 APPROVED BY: D. McCarthy DATE: 1/20/00  
 APPROVED BY: [Signature] DATE: [Blank]  
 APPROVED BY: [Signature] DATE: [Blank]  
 JOB NO. [Blank] ACTIVITY CODE: [Blank] ORDER NUMBER: 10969  
 REVISION: B

UNLESS OTHERWISE SPECIFIED	DECIMALS	FRACTIONS	ANGLES
TOLERANCES ON:			
SIZE	.XX		
AS NOTED			
DIMENSIONS ARE IN:	ENGLISH	METRIC	X
MATERIAL			
FINISH			

CURRENT TIME/DATE/FILE LOCATION: E:\Volume1\Aries\WPT 09/23/99 15:18  
 FILE AND/OR LINE LOCATION:

REVISIONS	DATE	REVISED BY	APPROVED
LTR			
DESCRIPTION			



- NOTES:
- 1) Dimensions are in millimeters
  - 2) Material: Barium Fluoride  $n(587.5618\text{nm})=1.474478 \pm 0.0005$   
Grain boundary free  
No visible inclusions
  - 3) Optical Surfaces:  
Scratch dig 60/40 per MIL-0-13830A  
Micro roughness/finish <20A rms  
Figure <16.65nm rms (0.0263 waves rms @ 632.8nm)  
Wedge < 0.200 degrees (TIR 24µm)
  - 4) Pitch polish to edge
  - 5) Chamfer all edges by 45 degrees
  - 6) Clear aperture - 6.0 mm
  - 7) High transmission coating for 1.0µm to 2.5µm - Not yet specified  
Must withstand 77K operating temperature
  - 8) All surface dimensions are at standard Temp & Pressure  
Radii are fit to vendor's test plates.
  - 9) Request inspection report based on final data.

CONTACT: ROLAND SARLOT 520-626-7252  
Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7839

DESIGNED BY: R. SARLOT	DATE: 9/23/99	PROJECT: IR Guide Star-Tip/Tilt Channel
DRAWN BY: M. Montoya	DATE: 12/15/99	PROJECT: ARIES
CHECKED BY:		TITLE: Camera Lens #1
APPROVED: D. McCarthy	DATE: 1/20/00	
APPROVED:		
APPROVED:		
SUB NO.:	ACTIVITY CODE:	DRAWING NUMBER: 10971
		REVISION: A

CURRENT TIME/DATE/FILE LOCATION: E:\Volumen\ARIES\9971 08/23/99 11:18  
FILE ARCHIVE LOCATION:

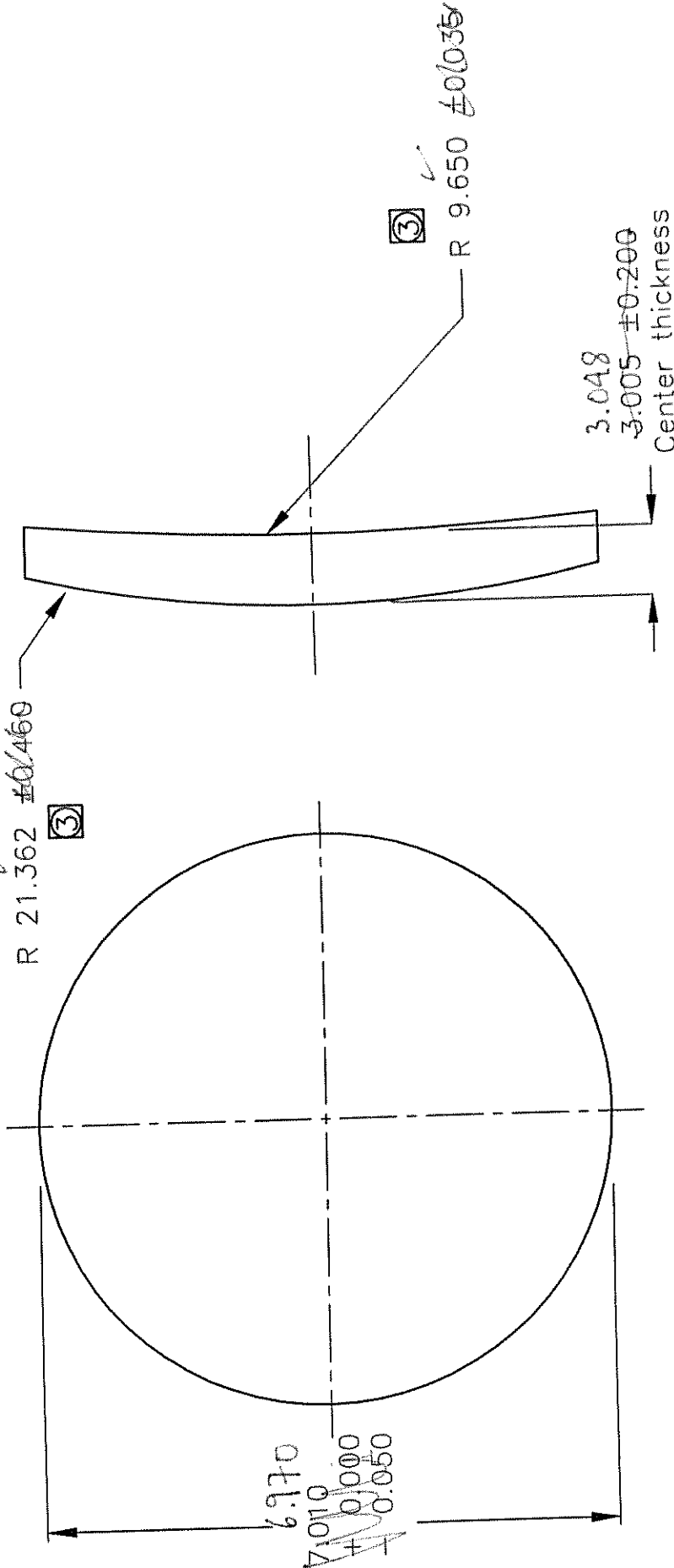
# Conv lens 1 T/H

IR Evidox

				INSPECTION DATA		
Customer PO# P259392				WO# 1331-07	PN 4550	Date 8-1-00
Full Quantity 1		Quantity Tested 1		Material B <sub>4</sub> F <sub>2</sub>	10971A	Lot # 1
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	7.0/0	<del>+1.000</del> - .050	11	Irreg. S1, Fr. or Wv.	.0263 λ rms
2	Width	—		12	Surface Quality / SD S1	< 60-40
3	Clear Aperture 1, mm	2.9		13	Radius S2, mm (CX)	10.08 ± .05
4	Clear Aperture 2, mm	2.8		14	Power S2, Fr. or Wv.	—
5	SAG 1, mm	.298		15	Irreg. S2, Fr. or Wv.	.0263 λ rms
6	SAG 2, mm	.629		16	Surface Quality / SD S2	< 60-40
7	Center Thickness, mm	3.005	± .200	17	TIR, mm	12 minutes (24 μm)
8	Full Thickness, mm	—		18	Wedge, mm	—
9	Radius S1, mm (CX)	20.76	± .750	19		—
10	Power S1, Fr. or Wv.	—		20		—
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	6.967					
2	—					
3	2.9					
4	2.8					
5	.298					
6	.629					
7	3.18					
8	—					
9	20.76 (CX)					
10	—					
11	< .0263 λ rms					
12	< 60-40					
13	10.08 (CX)					
14	—					
15	< .0263 λ rms					
16	< 60-40					
17	6.99 (14 μm)					
18	—					
19	—					
20	—					
				A points towards 10.080 ROC surface		
				QC Inspector		



REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION			



- NOTES:
- 1) Dimensions are in millimeters
  - 2) Material: Schott SF6 n(587.5618nm)=1.805180 ±0.0005 Grade 2, B1
  - 3) "Normal Quality" Striae
  - 4) Optical Surfaces: Scratch dig 60/40 per MIL-0-13830A Micro roughness/finish <20A rms Figure <16.65nm rms (0.0263 waves rms @ 632.8nm) Wedge < 0.100 degrees (TIR 12.2µm)
  - 5) Pitch polish to edge
  - 6) Chamfer all edges by 45 degrees
  - 7) Clear aperture - 6.0 mm
  - 8) High transmission coating for 1.0µm to 2.5µm -Not yet specified Must withstand 77K operating temperature
  - 9) All surface dimensions are at standard Temp & Pressure
  - 10) Radii are fit to vendor's test plates.
  - 11) Request inspection report based on final data.

*As per Delivered*

CONTACT: ROLAND SARLOT 520-626-7252

Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)821-7559

DESIGNED BY: R. SARLOT DATE: 9/3/99  
DRAWN BY: M. Montoya CHECKED BY: 12/15/99  
PROJECT: ARIES TITLE: Camera Lens #2

APPROVED: D. McCarthy 1/20/00  
APPROVED: APPROVED: DRAWING NUMBER: 10972

JOB NO. ACTIVITY CODE: A PLOT SIZE: None REVISION: A

CURRENT TIME/DATE/FILE LOCATION: E:\yammerson\misc\sa\01\_06/23/99 11:18

FILE ARCHIVE LOCATION:

UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS FRACTIONS ANGLES

.XX NOTED AS NOTED DIMENSIONS ARE IN ENGLISH METRIC X MATERIAL

FINISH

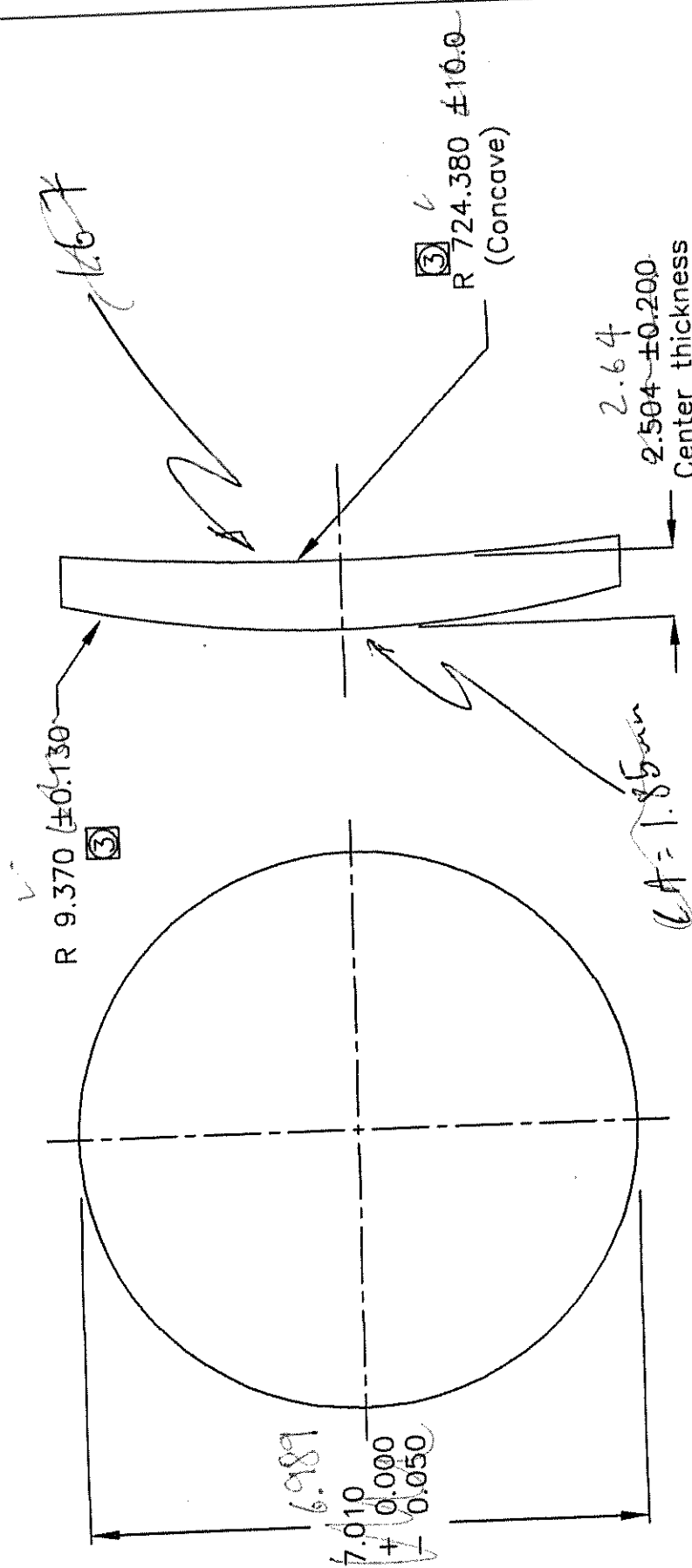
# Convex Lens 2 T/T

Customer PO# <b>P259392</b>	INSPECTION DATA	
Full Quantity <b>1</b>	WO# <b>1331-08</b>	PN <b>4551</b>
Quantity Tested <b>1</b>	Material <b>SF-6</b>	Date <b>8-1-00</b>
		Lot # <b>1</b>

N	Parameter	Specifications		N	Parameter	Specifications	
		NOM	TOL			NOM	TOL
1	Diameter or Length	7.010	$\pm 0.00$ $-0.050$	11	Irreg. S1, Fr. or Wv.	.0263 $\lambda$	rms
2	Width	—	—	12	Surface Quality / SD S1	260-40	—
3	Clear Aperture 1, mm	6.0	—	13	Radius S2, mm (CC)	9.650	$\pm 0.035$
4	Clear Aperture 2, mm	6.0	—	14	Power S2, Fr. or Wv.	—	—
5	SAG 1, mm	.289	—	15	Irreg. S2, Fr. or Wv.	.0263 $\lambda$	rms
6	SAG 2, mm	.659	—	16	Surface Quality / SD S2	260-40	—
7	Center Thickness, mm	3.005	$\pm 0.200$	17	TIR, mm	6 minutes	(12.2 $\mu$ m)
8	Full Thickness, mm	—	—	18	Wedge, mm	—	—
9	Radius S1, mm (CX)	21.362	$\pm 0.46$	19	—	—	—
10	Power S1, Fr. or Wv.	—	—	20	—	—	—

ACTUAL (MEASURED)					
Part Number					
N	1	2	3	4	5
1	6.970				
2	—				
3	6.0				
4	6.0				
5	.289				
6	.659				
7	3.048				
8	—				
9	21.362 (CX)				
10	—				
11	2.0263 $\lambda$ rms				
12	260-40				
13	9.650 (CC)				
14	—				
15	2.0263 $\lambda$ rms				
16	260-40				
17	1.1' (2.2 $\mu$ m)				
18	—				
19	—				
20	—				
A points towards 21.362 ROC surface					
QC Inspector					

REVISIONS		
LTR	DESCRIPTION	DATE



- NOTES:
- 1) Dimensions are in millimeters
  - 2) Material: Barium Fluoride  $n(587.5618\text{nm})=1.474478 \pm 0.0005$   
Grain boundary free  
No visible inclusions
  - 3) Optical Surfaces:  
Scratch dig 60/40 per MIL-0-13830A  
Micro roughness/finish <20A rms  
Figure <16.65nm rms (0.0263 waves rms @ 632.8nm)  
Wedge < 0.200 degrees (TIR 24µm)
  - 4) Wedge < 0.200 degrees (TIR 24µm)
  - 5) Pitch polish to edge
  - 6) Chamfer all edges by 45 degrees
  - 7) Clear aperture - 6.0 mm
  - 8) High transmission coating for 1.0µm to 2.5µm -Not yet specified  
Must withstand 77K operating temperature  
Must withstand standard Temp & Pressure
  - 9) All surface dimensions are at vendor's test plates.
  - 10) Radii are fit to vendor's test plates.
  - 11) Request inspection report based on final data.

CONTACT: ROLAND SARLOT 520-626-7252

Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7859

DATE: 9/3/99  
DRAWN BY: R. SARLOT  
CHECKED BY: M. Montoya  
APPROVED: D. McCarthy  
DATE: 12/15/99  
PROJECT: ARIES  
TITLE: Camera Lens #3

DATE: 1/20/00  
APPROVED: D. McCarthy  
DRAWING NUMBER: 10973  
REVISION: A

PLAT SIZE: A  
SCALE: None

ACTIVITY CODE: 2

CURRENT FILE/DATE/FILE LOCATION: E:\Vms\msm\msc\jart\09/23/98 11:38  
FILE AND/OR LOCATION:

UNLESS OTHERWISE SPECIFIED  
TOLERANCES ON:  
DIMENSIONS DECIMALS FRACTIONS ANGLES  
.XX ± .XX NOTED  
DIMENSIONS ARE IN: ENGLISH METRIC X  
MATERIAL: 2  
FINISH

# Cam Lens 3 T/T

				INSPECTION DATA		
Customer PO# P259392				WO# 1331-09	PN 4552	Date 8-1-00
Full Quantity 1	Quantity Tested 1			Material BqF2	10973A	Lot# 1
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	7.010	$\pm .050$ <small>F1000</small>	11	Irreg. S1, Fr. or Wv.	.0263 $\lambda$ rms
2	Width	—		12	Surface Quality / SD S1	< 60-40
3	Clear Aperture 1, mm	1.85		13	Radius S2, mm (CC)	724.38 $\pm 10.00$
4	Clear Aperture 2, mm	1.67		14	Power S2, Fr. or Wv.	—
5	SAG 1, mm	.680		15	Irreg. S2, Fr. or Wv.	.0263 $\lambda$ rms
6	SAG 2, mm	.008		16	Surface Quality / SD S2	< 60-40
7	Center Thickness, mm	2.504	$\pm 1.200$	17	TIR, mm	12 minutes (24 $\mu$ m)
8	Full Thickness, mm	—		18	Wedge, mm	—
9	Radius S1, mm (CX)	9.370	$\pm .130$	19		—
10	Power S1, Fr. or Wv.	—		20		—
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	6.989					
2	—					
3	1.85					
4	1.67					
5	.680					
6	.008					
7	2.64					
8	—					
9	9.370 (CX)					
10	—					
11	< .0263 $\lambda$ rms					
12	< 60-40					
13	724.38 (CC)					
14	—					
15	.029 $\lambda$ rms	over 5.2 mm CA. See interferogram				
16	< 60-40					
17	4.20 (9 $\mu$ m)					
18	—					
19	—					
20	—					
				A points towards 9.370 ROC surface		
				QC Inspector		

**Z490** GPI Application

Sm Aperture **Z490** Surface/Wavefront Map **Z490** Oblique Plot

PV: +0.000032 mm  
rms: -0.000061 mm

PV: +0.000032 mm  
rms: -0.000061 mm

PV 0.147 wave  
rms 0.029 wave  
Power -0.436 wave  
Size X 5.2 mm  
Size Y 5.2 mm

Removed: PST TLT FSR Trimmed: 0  
Aperture ID (%): 0 Aperture ID (%): 0 Filter: Off

**Z490** Measurement Controls

Comment: IR Guide Star, BaF2, ROC 724.380  
Part Number: 10973 A Min Mod Pct: 7  
PO#: P259392 Avgs: 0  
Instrument: Mark GPI Id 0 SN 4624 SB 0 Phase Avgs: 5

**Z490** Surface/Wavefront Profile

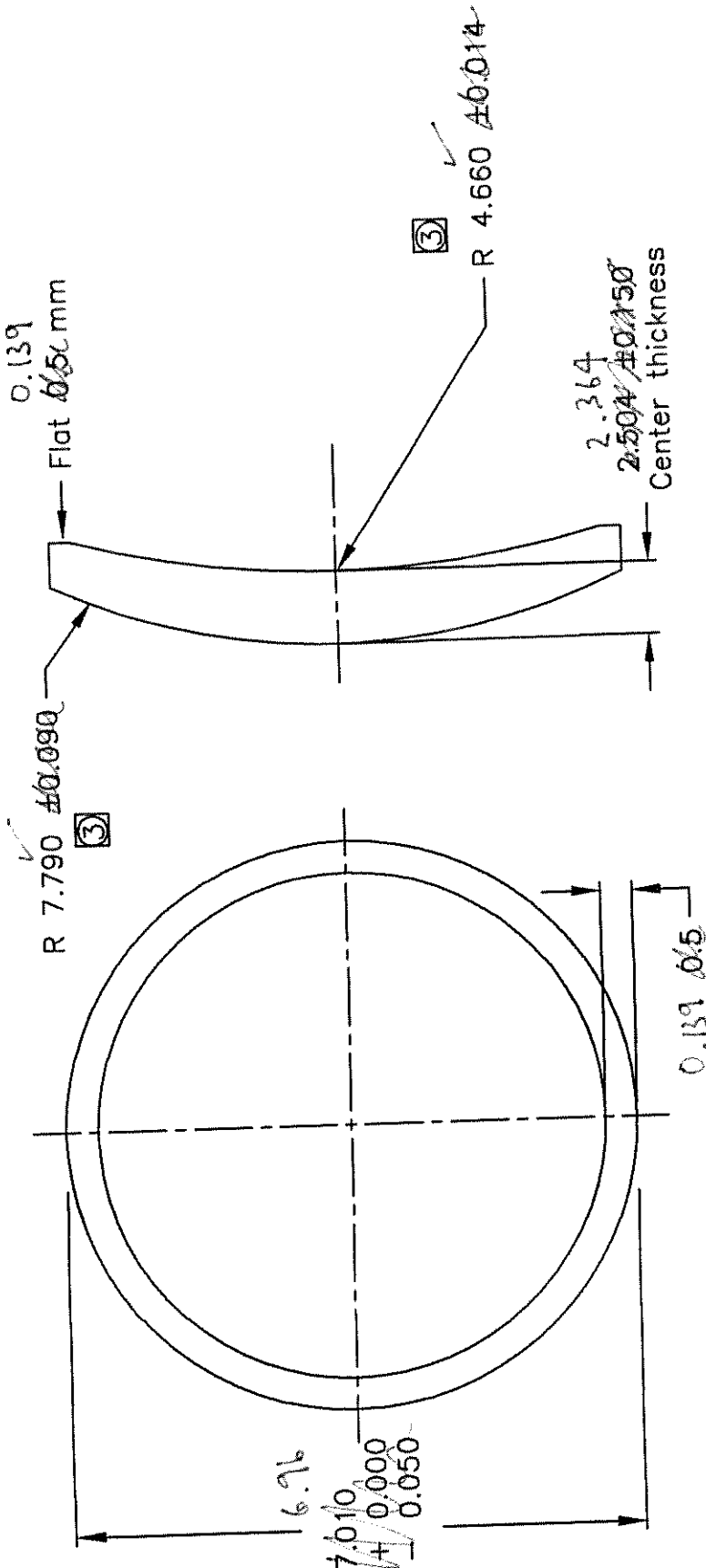
PV 0.105 wave rms 0.037 wave

**Z490** Intensity Map

Analyze Cntrl

S/W Profile  
Slope Mag  
Slope X  
Slope Y  
Zernikes  
ISO 10110-5  
SynthFringes  
Measure Attr  
Analyze Attr  
Process  
Report  
Units  
Video Monitor

REVISIONS		DATE	REVISION BY	APPROVED
LTR	DESCRIPTION			
A	Added flat to inside surface	2/8/00	R. Sartol	



- NOTES:
- Dimensions are in millimeters
  - Material: Schott SF6  $n(587.5618\text{nm})=1.805180 \pm 0.0005$  Grade 2, B1 "Normal Quality" Striae
  - Optical Surfaces:
    - Scratch dig 60/40 per MIL-0-13830A
    - Micro roughness/finish <20A rms
    - Figure <16.65nm rms (0.0263 waves rms @ 632.8nm)
    - Wedge < 0.200 degrees (TIR 24.4µm)
  - Pitch polish to edge
  - Chamfer all edges by 45 degrees
  - Clear aperture - 6.0 mm
  - High transmission coating for 1.0µm to 2.5µm - Not yet specified
  - Must withstand 77K operating temperature
  - All surface dimensions are at standard Temp & Pressure
  - 10) Radii are fit to vendor's test plates.
  - 11) Request inspection report based on final data.

*Approved*

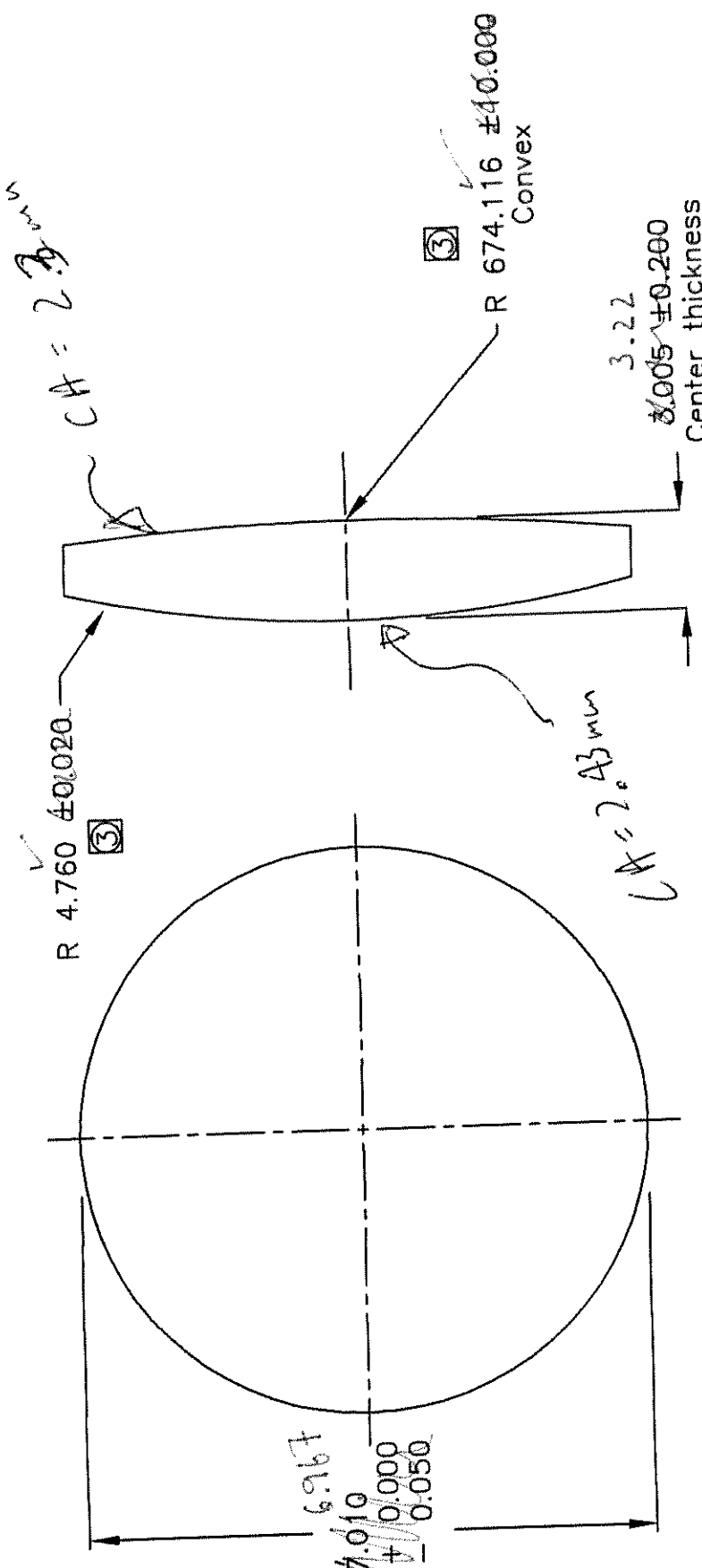
DESIGNED BY: R. SARLOT	DATE: 9/3/99	CONTACT: ROLAND SARLOT 520-626-7252
DRAWN BY: M. Montoya	DATE: 12/15/99	Steward Observatory, University of Arizona 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7859
CHECKED BY:		PROJECT: IR Guide Star-Focus Channel
APPROVED: D. McCarthy	DATE: 1/20/00	PROJECT: ARIES
APPROVED:		TITLE: Camera Lens #1
APPROVED:		
JOB NO.:	ACTIVITY CODE:	PLAT SIZE: A
		SCALE: None
		SPARRING NUMBER: 10975
		REVISION: B

UNLESS OTHERWISE SPECIFIED	FINISH
TOLERANCES ON:	
DIMENSIONS	
FRACTIONS	
DECIMALS	
ANGLES	
XX	
NOTED	
AS	
DIMENSIONS ARE IN:	
ENGLISH	
METRIC	
MATERIAL	
	2
CURRENT TIME/DATE/FILE LOCATION	2: Y:\mcs\mcs\proj\4877 08/23/98 11:18
FILE ARCHIVE LOCATION	

# Cam Lens 1 Focus

				INSPECTION DATA		
Customer PO# <i>P259392</i>				WO# <i>1331-04</i>	PN <i>4547</i>	Date <i>8-1-00</i>
Full Quantity <i>1</i>		Quantity Tested <i>1</i>		Material <i>SF-6</i>	<i>10975B</i>	Lot # <i>1</i>
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	<i>7.010</i>	<i>+1.000 -1.050</i>	11	Irreg. S1, Fr. or Wv.	<i>.0263 λ rms</i>
2	Width	—		12	Surface Quality / SD S1	<i>&lt; 60-40</i>
3	Clear Aperture 1, mm	<i>6.0</i>		13	Radius S2, mm (CC)	<i>4.660 ±1.014</i>
4	Clear Aperture 2, mm	<i>6.0</i>		14	Power S2, Fr. or Wv.	—
5	SAG 1, mm	<i>.833</i>		15	Irreg. S2, Fr. or Wv.	<i>.0263 λ rms</i>
6	SAG 2, mm	<i>1.589</i>		16	Surface Quality / SD S2	<i>&lt; 60-40</i>
7	Center Thickness, mm	<i>2.504</i>	<i>±1.150</i>	17	TIR, mm	<i>12 minutes (24.4 μm)</i>
8	Full Thickness, mm	—		18	Wedge, mm	—
9	Radius S1, mm (CX)	<i>7.790</i>	<i>±1.09</i>	19	ID (CC)	<i>6.01 mm ref.</i>
10	Power S1, Fr. or Wv.	—		20	Flat (CC)	<i>.5 mm ref</i>
ACTUAL (MEASURED)						
Part Number						
N	1	2	3	4	5	6
1	<i>6.960</i>					
2	—					
3	<i>6.0</i>					
4	<i>6.0</i>					
5	<i>.833</i>					
6	<i>1.589</i>					
7	<i>2.364</i>					
8	—					
9	<i>7.790 (CX)</i>					
10	—					
11	<i>&lt;.0263 λ rms</i>					
12	<i>&lt; 60-40</i>					
13	<i>4.660 (CC)</i>					
14	—					
15	<i>&lt;.0263 λ rms</i>					
16	<i>&lt; 60-40</i>					
17	<i>.71' (1.4 μm)</i>					
18	—					
19	<i>6.682</i>					
20	<i>.139</i>					
	<i>A points towards 7.790 ROC surface</i>					
QC Inspector						

REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION			



- NOTES:
- 1) Dimensions are in millimeters
  - 2) Material: Barium Fluoride  $n(587.5618\text{nm})=1.474478 \pm 0.0005$   
Grain boundary free  
No visible inclusions
  - 3) Optical Surfaces:  
Scratch dig 60/40 per MIL-0-13830A  
Micro roughness/finish <20A rms  
Figure <16.65nm rms (0.0263 waves rms @ 632.8nm)  
Wedge < 0.100 degrees (TIR 12µm)
  - 4) Pitch polish to edge
  - 5) Chamfer all edges by 45 degrees
  - 6) Clear aperture - 6.0 mm
  - 7) High transmission coating for 1.0µm to 2.5µm -Not yet specified  
Must withstand 77K operating temperature
  - 8) All surface dimensions are at standard Temp & Pressure
  - 9) Radii are fit to vendor's test plates.
  - 10) Request inspection report based on final data.

*As Delivered*

CONTACT: ROLAND SARLOT 520-626-7252  
Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659

DESIGNED BY: R. SARLOT	DATE: 9/3/99	PROJECT: ARIES
DRAWN BY: M. Montoya	CHECKED BY:	TITLE: Camera Lens #2
APPROVED: D. McCarthy	DATE: 1/20/00	
APPROVED:		
APPROVED:		
JOB NO.	ACTIVITY CODE	GENERAL NUMBER: 10976
		REVISIONS: A

UNLESS OTHERWISE SPECIFIED:  
TOLERANCES ON:  
DECIMALS FRACTIONS ANGLES  
.XX .XX  
AS NOTED  
DIMENSIONS ARE IN:  
ENGLISH METRIC  
MATERIAL  
FINISH

CURRENT TIME/DATE/FILE LOCATION: E:\Vendors\MSK\9871 09/23/99 11:18  
FILE ARCHIVE LOCATION:



# Cam Lens 2 Focus

				INSPECTION DATA			
Customer PO# <b>P259392</b>				WO# <b>1331-05</b>	PN <b>4548</b>	Date <b>8-1-00</b>	
Full Quantity <b>1</b>	Quantity Tested <b>1</b>			Material <b>B<sub>9</sub>F<sub>2</sub></b>	<b>10976 A</b>	Lot # <b>1</b>	
Parameter		Specifications		Parameter		Specifications	
N		NOM	TOL	N		NOM	TOL
1	Diameter or Length	<b>7.010</b>	<b>+1.000 -.050</b>	11	Irreg. S1, Fr. or Wv.	<b>.0263 λ rms</b>	
2	Width	<b>—</b>		12	Surface Quality / SD S1	<b>&lt; 60-40</b>	
3	Clear Aperture 1, mm	<b>2.43</b>		13	Radius S2, mm <b>(CX)</b>	<b>674.116</b>	<b>+/- 10.000</b>
4	Clear Aperture 2, mm	<b>2.30</b>		14	Power S2, Fr. or Wv.	<b>—</b>	
5	SAG 1, mm	<b>1.539</b>		15	Irreg. S2, Fr. or Wv.	<b>.0263 λ rms</b>	
6	SAG 2, mm	<b>.009</b>		16	Surface Quality / SD S2	<b>&lt; 60-40</b>	
7	Center Thickness, mm	<b>3.005</b>	<b>+/- .200</b>	17	TIR, mm	<b>6 minutes (12 μm)</b>	
8	Full Thickness, mm	<b>—</b>		18	Wedge, mm	<b>—</b>	
9	Radius S1, mm <b>(CX)</b>	<b>4.760</b>	<b>+/- .020</b>	19		<b>—</b>	
10	Power S1, Fr. or Wv.	<b>—</b>		20		<b>—</b>	
				ACTUAL (MEASURED)			
				Part Number			
N	1	2	3	4	5	6	
1	<b>6.967</b>						
2	<b>—</b>						
3	<b>2.43</b>						
4	<b>2.30</b>						
5	<b>1.539</b>						
6	<b>.009</b>						
7	<b>3.22</b>						
8	<b>—</b>						
9	<b>4.760 (CX)</b>						
10	<b>—</b>						
11	<b>&lt;.0263 λ rms</b>						
12	<b>&lt; 60-40</b>						
13	<b>674.116 (CX)</b>						
14	<b>—</b>						
15	<b>.021 λ rms over 6.0 mm CA. See interferogram</b>						
16	<b>&lt; 60-40</b>						
17	<b>5.59 (11 μm)</b>						
18	<b>—</b>						
19	<b>—</b>						
20	<b>—</b>						
	<b>1 points towards</b>	<b>4.760</b>	<b>ROC surface</b>				
				QC Inspector			

GPI Application

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Sm Aperture Z490

MEASURE
Analyze
Mask Data
Save Data
Load Data
Calibrate
Reset

Analyze Cntr

Surface/Wavefront Map

Z490

Oblique Plot

---

Surface/Wavefront Profile

Z490

PV  wave  wave

Intensity Map

Z490

---

Removed: BFT TLT BFR

Aperture OD (%):  Aperture ID (%):

Trimmed:  Filter:

Measurement Controls

Z490

Comment: Camera lens #2, Baf2, ROC 674.116

Part Number:  Min Mod Pct:

PO#:  Avgs:

Instrument: Mark GPI Id D 8N 4S24 SB 0 Phase Avgs:

---

S/W Profile

Slope X

Slope Y

DBP

MTF

MTF Profile

Zernikes

ISO

SynthFringes

Measure Attr

Analyze Attr

Process

Report

Units

Video Monitor

PV  wave

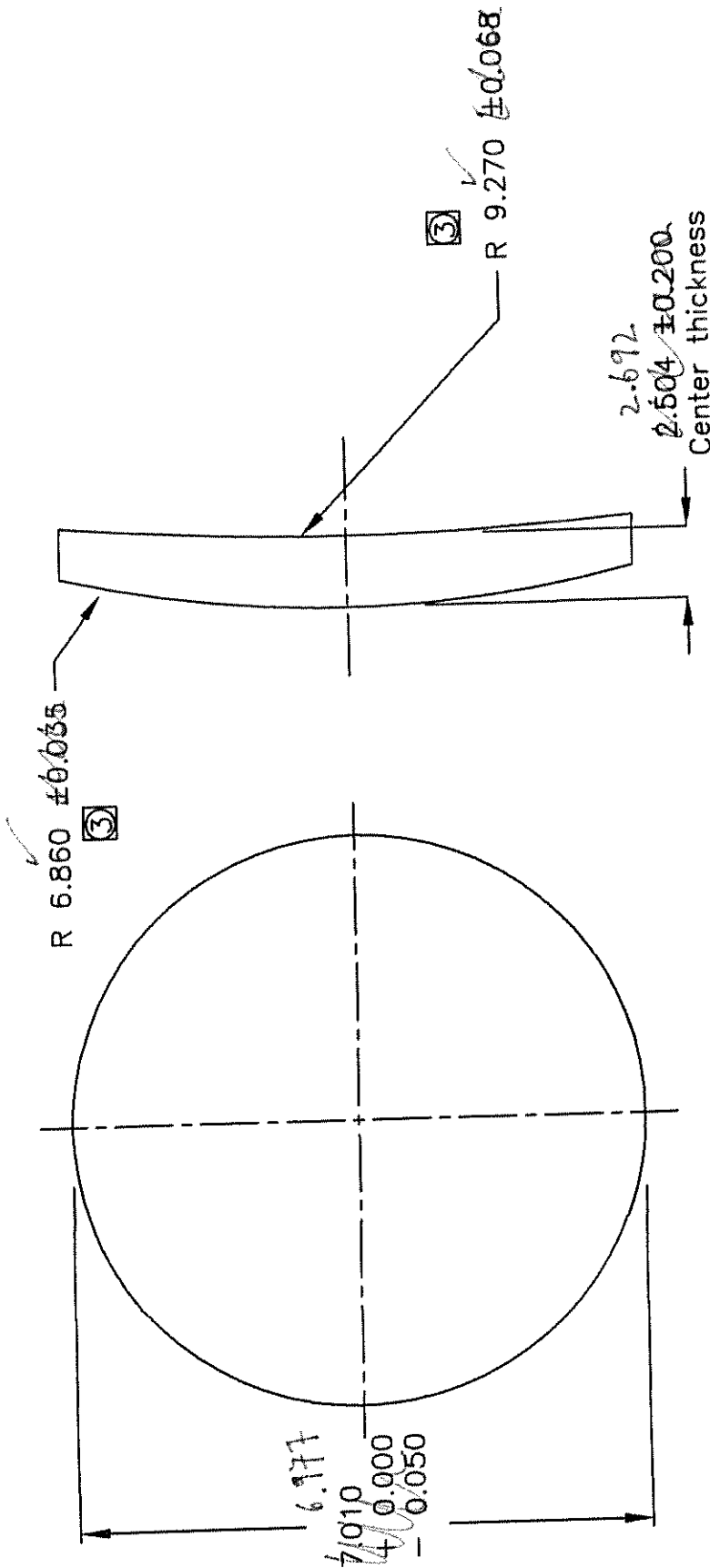
rms  wave

Power  wave

Size X  mm

Size Y  mm

REVISIONS		
LTR	DESCRIPTION	DATE



NOTES:

- Dimensions are in millimeters
- Material: Schott SF6  $n(587.5618\text{nm})=1.805180 \pm 0.0005$  Grade 2, B1 "Normal Quality" Striae
- Optical Surfaces:
  - Scratch dig 60/40 per MIL-0-13830A
  - Micro roughness/finish <20A rms
  - Figure <16.65nm rms (0.0263 waves rms @ 632.8nm)
- Wedge < 0.200 degrees (TIR 24um)
- Pitch polish to edge
- Chamfer all edges by 45 degrees
- Clear aperture - 6.0 mm
- High transmission coating for 1.0um to 2.5um -Not yet specified Must withstand 77K operating temperature
- All surface dimensions are at standard Temp & Pressure
- Radii are fit to vendor's test plates.
- Request inspection report based on final data.

CONTACT: ROLAND SARLOT 520-626-7252

Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)821-7859

DESIGNED BY: R. SARLOT  
DATE: 9/3/99  
PROJECT: IR Guide Star-Focus Channel

DRAWN BY: M. Montoya  
CHECKED BY: D. McCarthy  
DATE: 12/15/99  
PROJECT: ARIES

APPROVED BY: D. McCarthy  
DATE: 1/20/00  
PROJECT: Camera Lens #3

APPROVED BY: [Signature]  
DATE: [Blank]  
PROJECT: [Blank]

APPROVED BY: [Blank]  
DATE: [Blank]  
PROJECT: [Blank]

APPROVED BY: [Blank]  
DATE: [Blank]  
PROJECT: [Blank]

APPROVED BY: [Blank]  
DATE: [Blank]  
PROJECT: [Blank]

APPROVED BY: [Blank]  
DATE: [Blank]  
PROJECT: [Blank]

APPROVED BY: [Blank]  
DATE: [Blank]  
PROJECT: [Blank]

APPROVED BY: [Blank]  
DATE: [Blank]  
PROJECT: [Blank]

APPROVED BY: [Blank]  
DATE: [Blank]  
PROJECT: [Blank]

APPROVED BY: [Blank]  
DATE: [Blank]  
PROJECT: [Blank]

APPROVED BY: [Blank]  
DATE: [Blank]  
PROJECT: [Blank]

UNLESS OTHERWISE SPECIFIED:	
TOLERANCES ON:	FRACTIONS ANGLES
DECIMALS	
.XXX	.XX
AS	NOTED
DIMENSIONS ARE IN:	
ENGLISH	METRIC
MATERIAL	
2	
FINISH	

PLAT SIZE: A  
SCALE: None  
DRAWING NUMBER: 10977

CURRENT TIME/DATE/FILE LOCATION: E:\Vme\stew\ARIES\GAT1 08/23/98 11:18

FILE ARCHIVE LOCATION:

# Cam Lens 3 Focus

				INSPECTION DATA		
Customer PO# <b>P259392</b>				WO# <b>1331-06</b>	PN <b>4549</b>	Date <b>8-1-00</b>
Full Quantity <b>1</b>	Quantity Tested <b>1</b>			Material <b>SF-6</b>	<b>10977 A</b>	Lot # <b>1</b>
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	<b>7.010</b>	<b>+1.000 -.050</b>	11	Irreg. S1, Fr. or Wv.	<b>.0263 λ rms</b>
2	Width	—		12	Surface Quality / SD S1	<b>&lt; 60-40</b>
3	Clear Aperture 1, mm	<b>6.0</b>		13	Radius S2, mm (CC)	<b>9.270 ±.068</b>
4	Clear Aperture 2, mm	<b>6.0</b>		14	Power S2, Fr. or Wv.	—
5	SAG 1, mm	<b>.963</b>		15	Irreg. S2, Fr. or Wv.	<b>.0263 λ rms</b>
6	SAG 2, mm	<b>.688</b>		16	Surface Quality / SD S2	<b>&lt; 60-40</b>
7	Center Thickness, mm	<b>2.504</b>	<b>±.200</b>	17	TIR, mm	<b>12 minutes (24 μm)</b>
8	Full Thickness, mm	—		18	Wedge, mm	—
9	Radius S1, mm (CX)	<b>6.860</b>		19		—
10	Power S1, Fr. or Wv.	—		20		—
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	<b>6.977</b>					
2	—					
3	<b>6.0</b>					
4	<b>6.0</b>					
5	<b>.963</b>					
6	<b>.688</b>					
7	<b>2.692</b>					
8	—					
9	<b>6.860 (CX)</b>					
10	—					
11	<b>&lt;.0263 λ rms</b>					
12	<b>&lt; 60-40</b>					
13	<b>9.270 (CC)</b>					
14	—					
15	<b>&lt;.0263 λ rms</b>					
16	<b>&lt; 60-40</b>					
17	<b>1.2' (2.4 μm)</b>					
18	—					
19	—					
20	—					
				<b>1 points towards 6.860 ROC surface</b>		
				QC Inspector		

# MIRROR

				INSPECTION DATA		
Customer PO# <i>P252602</i>				WO# <i>1300-02</i>	PN <i>4507</i>	Date
Full Quantity <i>1</i>		Quantity Tested <i>1</i>		Material <i>Fused Silica</i>	<i>10447B</i>	Lot# <i>1</i>
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	<i>105.002</i>	<i>+ .008 - .050</i>	11	Irreg. S1, Fr. or Wv.	<i>16.65 <math>\mu</math>m rms</i>
2	Width	<i>105.002</i>	<i>+ .008 - .050</i>	12	Surface Quality / SD S1	<i>60/40</i>
3	Clear Aperture 1, mm	<i>100.00</i>		13	Radius S2, mm	<i><math>\infty</math></i>
4	Clear Aperture 2, mm	<i>100.00</i>		14	Power S2, Fr. or Wv.	<i>10 Fr.</i>
5	SAG 1, mm	<i>—</i>		15	Irreg. S2, Fr. or Wv.	<i>10 Fr.</i>
6	SAG 2, mm	<i>—</i>		16	Surface Quality / SD S2	<i>60/40</i>
7	Center Thickness, mm	<i>10.00</i>	<i><math>\pm .10</math></i>	17	TIR, mm	<i>—</i>
8	Full Thickness, mm	<i>—</i>		18	Wedge, mm	<i>50 microns</i>
9	Radius S1, mm	<i><math>\infty</math></i>		19		
10	Power S1, Fr. or Wv.	<i>.5 Fr</i>		20		
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	<i>104.97</i>					
2	<i>104.97</i>					
3	<i>—</i>					
4	<i>—</i>					
5	<i>—</i>					
6	<i>—</i>					
7	<i>9.95</i>					
8	<i>—</i>					
9	<i><math>\infty</math></i>					
10	<i>.312 <math>\lambda</math> P-V</i>	<i>see interferogram</i>				
11	<i><math>\approx .05</math> rms</i>	<i>" "</i>				
12	<i>&lt; 60/40</i>					
13	<i><math>\infty</math></i>					
14	<i>2.207</i>	<i>see interferogram</i>				
15	<i>2.207</i>	<i>" "</i>				
16	<i>&lt; 60/40</i>					
17	<i>—</i>					
18	<i>23 microns</i>					
19						
20						
				QC Inspector		

GPI Application  
Surface/Wavefront Map

Z490 Oblique Plot

Removed: PST filter  
Aperture ID (#):  
Aperture OD (%):  
Trimmed: 1  
Filter: Off

Z490 Intensity Map

Z490 Surface/Wavefront Profile

PV 0.312 wave  
rms 0.047 wave  
Power -0.059 wave  
Size X mm  
Size Y mm

Z490 Measurement Attributes

PV 0.141 wave rms 0.046 wave

Analyze Attr  
Process  
Report  
Units  
Video Monitor

MEASURE  
Analyze  
Mask Data  
Save Data  
Load Data  
Calibrate  
Reset

Measure Cntr  
Analyze Cntr

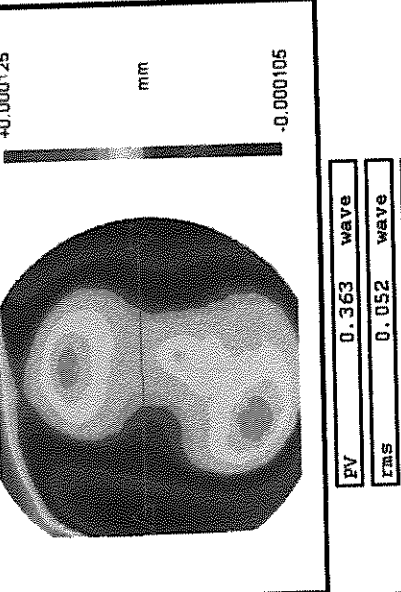
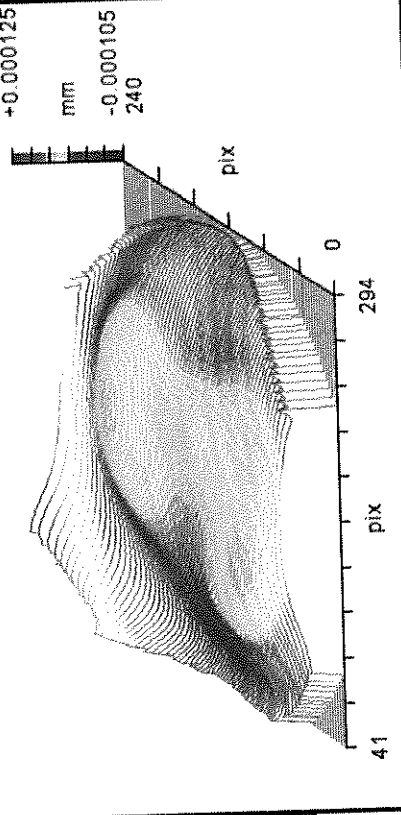
S/W Profile  
Slope Mag  
Slope X  
Slope Y

PBF  
MTF  
MTF Profile  
Zernikes  
ISO 10110-5  
SynthFringes

Tue Jan 04 08:43:35 2000  
P/N: 10447 B  
PO#: P252602  
Camera Res: um  
Right Edge Power On, No Aperture To Edge

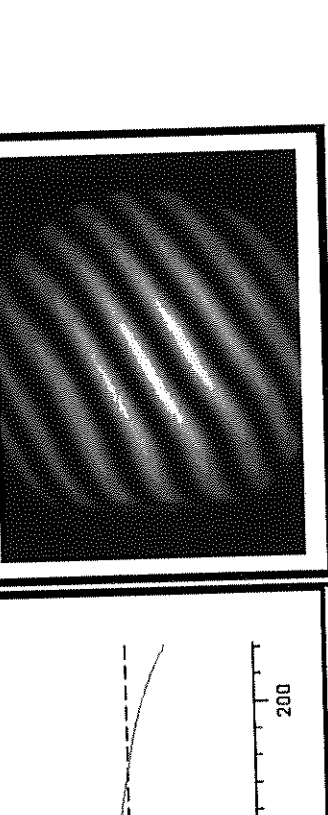
Data sign: Normal  
Scale Factor: 0.5

Roland - Arrow "A" points toward this surface  
Note: ...



Removed: PST TLT  
 Aperture OD (%):  
 Aperture ID (%):  
 Filter: Off  
 Trimmed: 1

PV 0.363 wave  
 rms 0.052 wave  
 Power -0.101 wave  
 Size X mm  
 Size Y mm



Z490 Surface/Wavefront Profile  
 PV 0.162 wave  
 rms 0.044 wave

Sm Aperture

- MEASURE
- Analyze
- Mask Data
- Save Data
- Load Data
- Calibrate
- Reset

Measure Cntr

Analyze Cntr

R/W Profile

Slope Mag

Slope X

Slope Y

PSE

MTF

MTF Profile

Zernikes

ISO 10110-5

Synthetic Fringes

Analyze Attr

Process

Report

Units

Video Monitor

Z490

Z490

Z490

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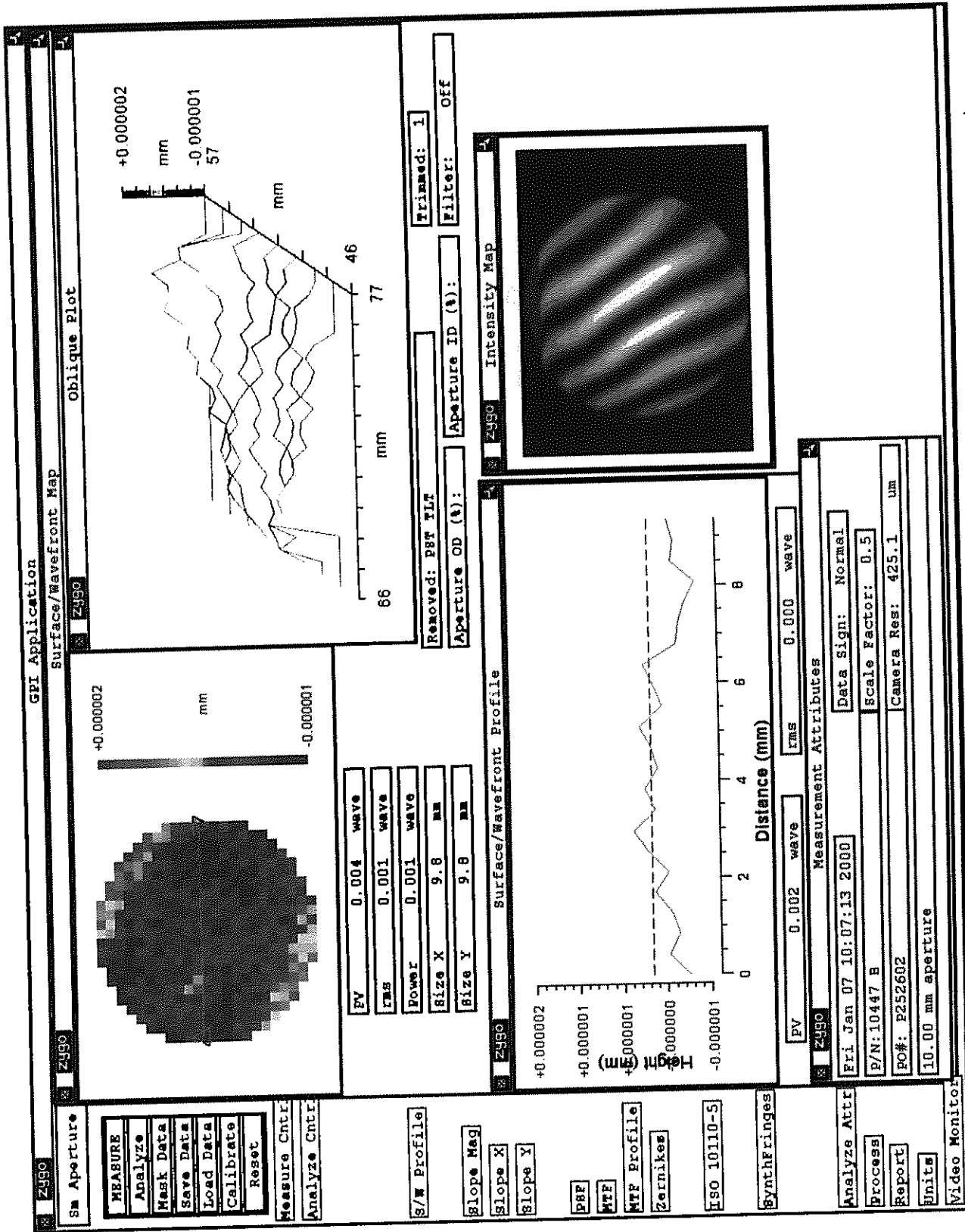
Z490

Z490

Z490

Z490

Z490



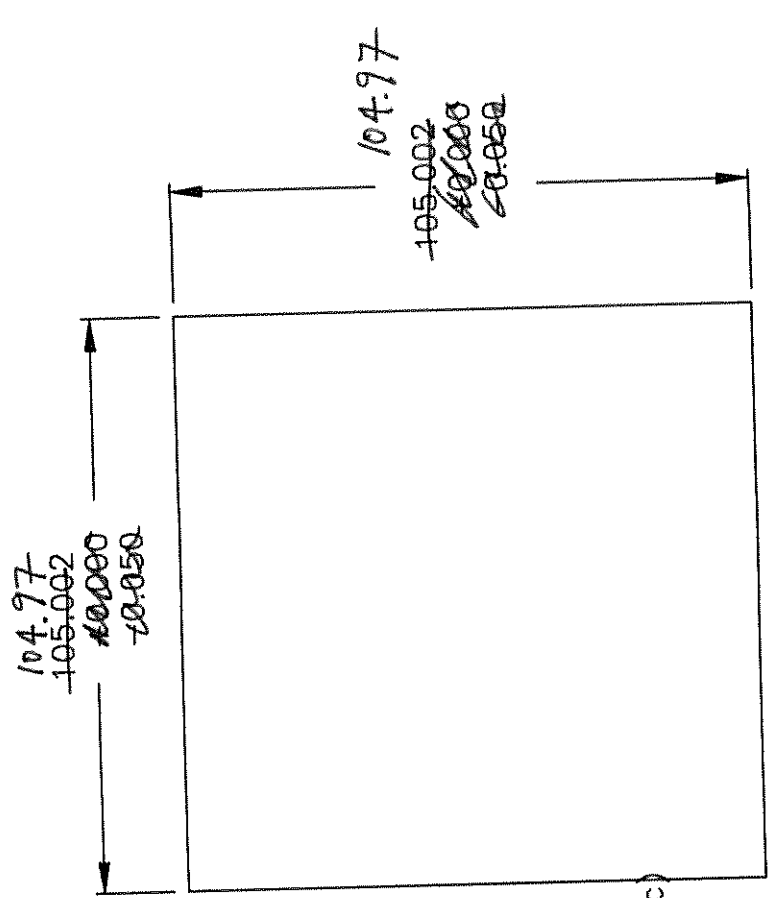
*Roland - I measured about 20 spots at 10 mm aperture. All ranged between .001 wave rms and .002 wave rms.*







REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION			
B	Decreased diameter.	6/19/99	R. Sarlot	

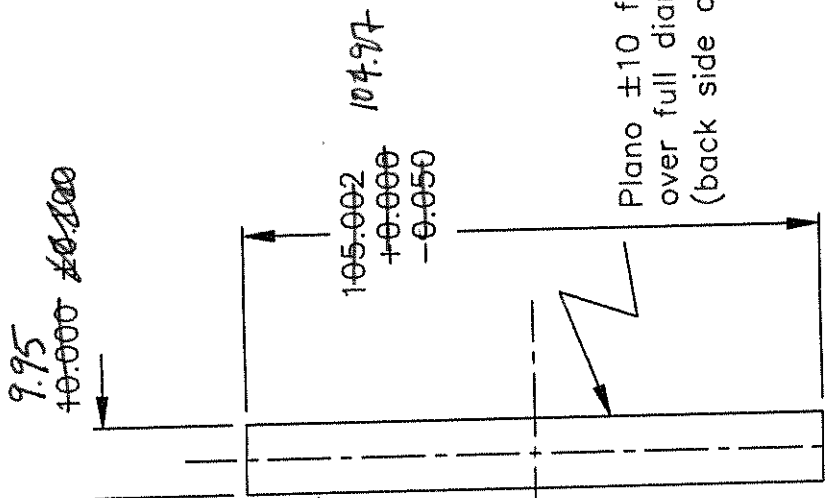


*AS Delivered*

CONTACT: ROLAND SARLOT 520-626-7252  
 Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659

DESIGNED BY	R. SARLOT	DATE	05/08/98	CATEGORY	
CHECKED BY	R. SARLOT	DATE	03/19/99	PROJECT	ARIES
APPROVER		TITLE	Offner Fold Flat Square Mirror		
APPROVER		PLAT SIZE	None	OWNERS NUMBER	10447
APPROVER		ACTIVITY CODE	A	REVISION	B
JOB NO.		CURRENT TIME/DATE/FILE LOCATION			
		FILE ARCHIVE LOCATION			

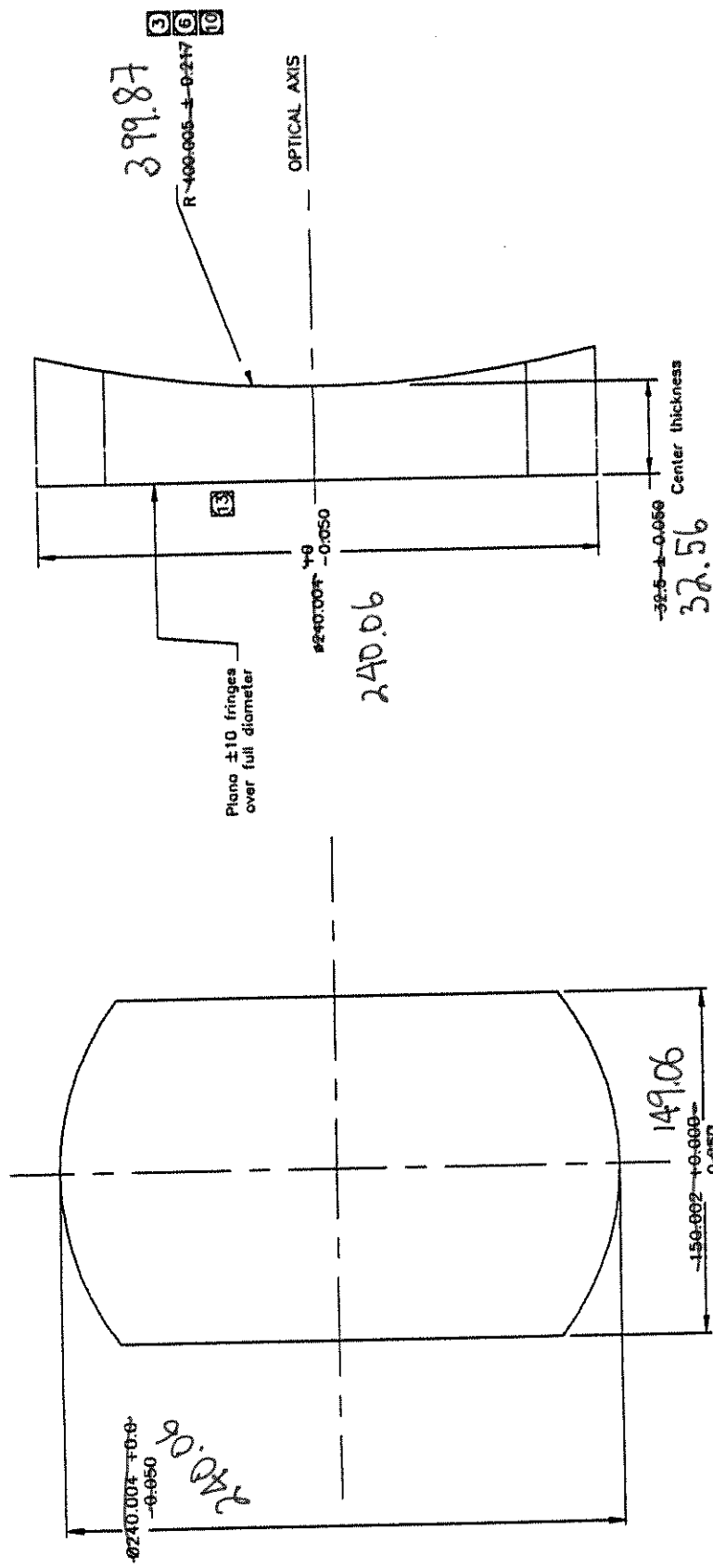
UNLESS OTHERWISE SPECIFIED	
TOLERANCES ON:	
DIMENSIONS	ANGLES
XXX DECIMALS	AS NOTED
XX NOTED	ENGLISH
AS	METRIC
DIMENSIONS ARE IN:	
MATERIAL	Fused Silica
FINISH	



- NOTES:
- 1) Dimensions are in millimeters
  - 2) Polished to full diameter
  - 3) Optical Surface: < 16.65nm rms figure
  - 4) Wedge < 10A rms micro roughness/finish
  - 5) Clear aperture - 100 mm diameter centered at part midpoint
  - 6) Pura gold coating for 1-5um high reflectivity
  - 7) Bevel all edges with 0.5mm face width max by 45 degrees
  - 8) Scratch and dig spec: 60/40 per mil-0-13830A
  - 9) All surface dimensions are at standard temperature and pressure
  - 10) Request inspection report based on final data

23A  
 0.0126°

REV	DESCRIPTION	DATE	DESIGNED BY	APPROVED BY
1	Revised drawing to include plate to 100 mm	07/27/98		



**NOTES:**

- 1) Dimensions are in millimeters
- 2) Polished to full diameter
- 3) Optical Surface:  $< 16.65$ nm rms figure  $< 10A$  rms micro roughness/finish
- 4) Wedge  $< 0.0024$  degrees (TIR 10um)
- 5) Clear aperture - 225mm diameter
- 6) Pure gold coating for 1-5um high reflectivity
- 8) Back surface of optic is perpendicular to optical axis
- 9) Bevel all edges with 0.5mm face width max by 45 degrees
- 10) Scratch and dig spec: 60/40 per mil-Q-13830A
- 11) All surface dimensions are at standard temperature and pressure
- 12) Request inspection report based on final data
- 13) Plano surface used as mechanical alignment reference. Polish to edge.

*Delivered*

*8.32*

*Bevels over chamfer part stage*

*parent part*

DATE	BY	DESCRIPTION
02/15/98	ROLAND SARLOT	DESIGN
03/15/98	ROLAND SARLOT	DESIGN
07/27/98	ROLAND SARLOT	DESIGN

CONTACT: ROLAND SARLOT 520-626-7252  
Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)821-7888

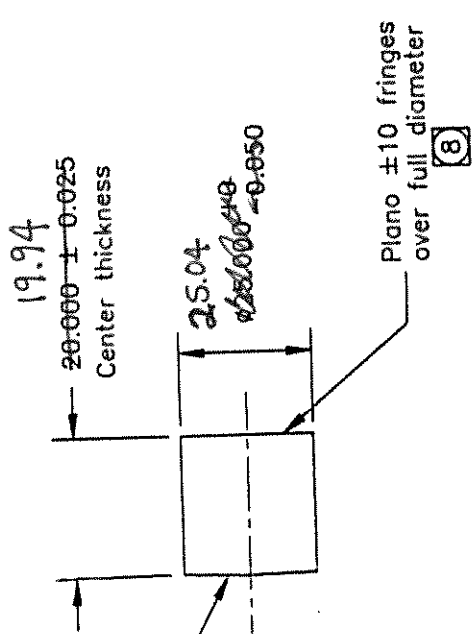
UNLESS OTHERWISE SPECIFIED:	STANDARD: ANCOPT Infrared Echelle Spectrograph - ARCS
TOLERANCES ON DIMENSIONS:	FRAMES: OFFNER RELAY
FINISHES:	PRIMARY MIRROR
PROFILES:	Spherical
PLATE MATERIAL:	Fused Silica
FINISH:	

DATE	BY	DESCRIPTION
02/15/98	ROLAND SARLOT	DESIGN
03/15/98	ROLAND SARLOT	DESIGN
07/27/98	ROLAND SARLOT	DESIGN

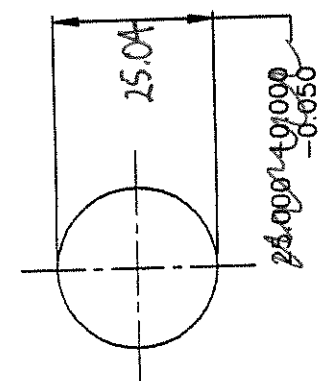
DATE	BY	DESCRIPTION
02/15/98	ROLAND SARLOT	DESIGN
03/15/98	ROLAND SARLOT	DESIGN
07/27/98	ROLAND SARLOT	DESIGN

DATE	BY	DESCRIPTION
02/15/98	ROLAND SARLOT	DESIGN
03/15/98	ROLAND SARLOT	DESIGN
07/27/98	ROLAND SARLOT	DESIGN

REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION			



202.75  
R-201-683-11-318  
(Convex)



OPTICAL AXIS

NOTES:

- 1) Dimensions are in millimeters
- 2) Polished to full diameter
- 3) Optical Surface: < 16.65nm rms figure
- 4) < 10A rms micro roughness/finish
- 5) Wedge < 0.023 degrees (TIR 10um)
- 6) Clear aperture - 20.0mm diameter
- 7) Pure gold coating for 1-5um high reflectivity
- 8) Optical axis to mechanical axis decentration < ±0.050
- 9) Back surface of optic is perpendicular to optical axis and used as mechanical reference
- 10) Bevel all edges with 0.5mm face width max by 45 degrees
- 11) Scratch and dig spec: 60/40 per mil-0-13830A
- 12) All surface dimensions are at standard temperature and pressure
- Request inspection report based on final data

As  
Delivered

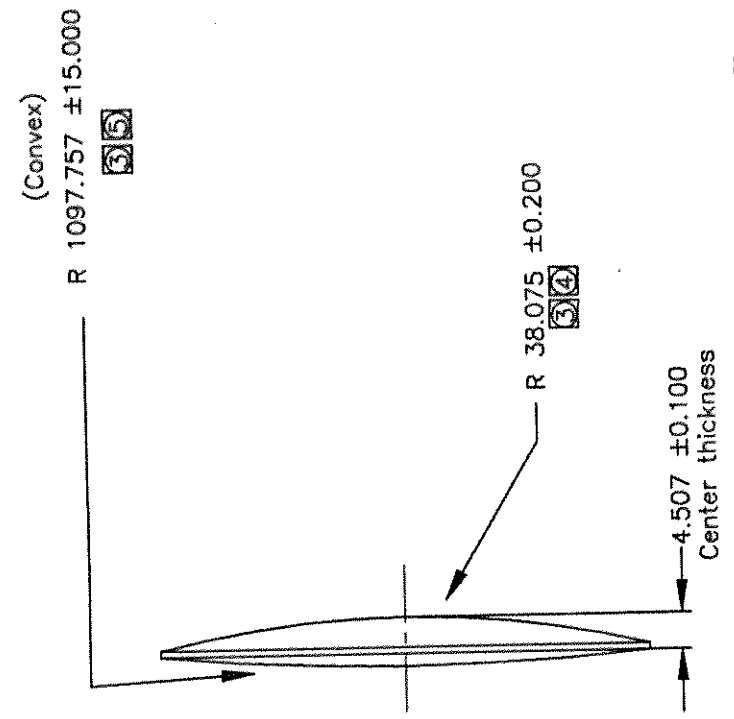
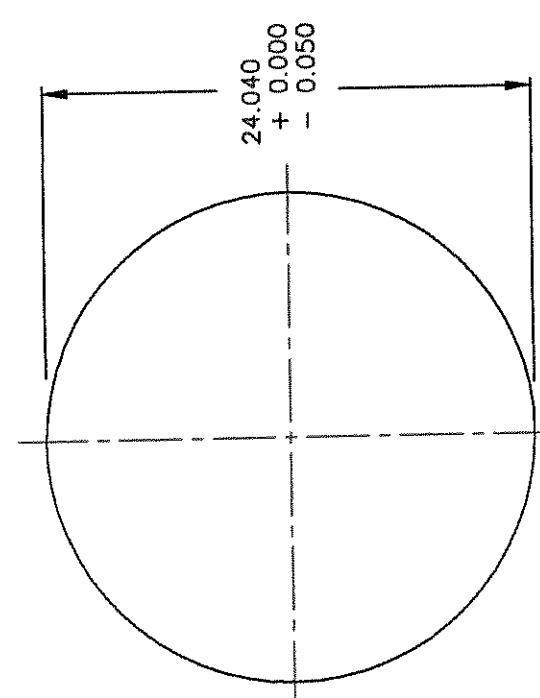
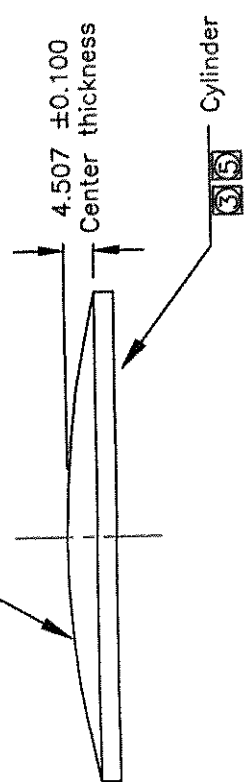
CONTACT: ROLAND SARLOT 520-626-7252  
Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)821-7859

DESIGNED BY: ROLAND SARLOT	DATE: 9/11/98	PROJECT: Arizona Infrared Echelle Spectrograph - ARIES
DRAWN BY: ROLAND SARLOT	CHECKED BY: Don McCarthy	TITLE: OFFNER RELAY SECONDARY MIRROR Spherical
APPROVED:	APPROVED:	PLOT SIZE SCALE: None
APPROVED:	APPROVED:	DRAWING NUMBER: 10441
JOB NO.:	ACTIVITY CODE:	REVISION: A
CURRENT TIME/DATE/FILE LOCATION:		
FILE ARCHIVE LOCATION:		

UNLESS OTHERWISE SPECIFIED:	TOLERANCES ON:
REMARKS:	INCREASING ANGLES
.XX	AS NOTED
.XX	ENGLISH
.XX	METRIC
MATERIAL: Fused Silica	
FINISH	

REVISIONS		
LTR	DESCRIPTION	DATE
B	Tolerance change on faster radius	7/27/99

8/30/00 RS+2MM  
24.00/24.03/24.00 min

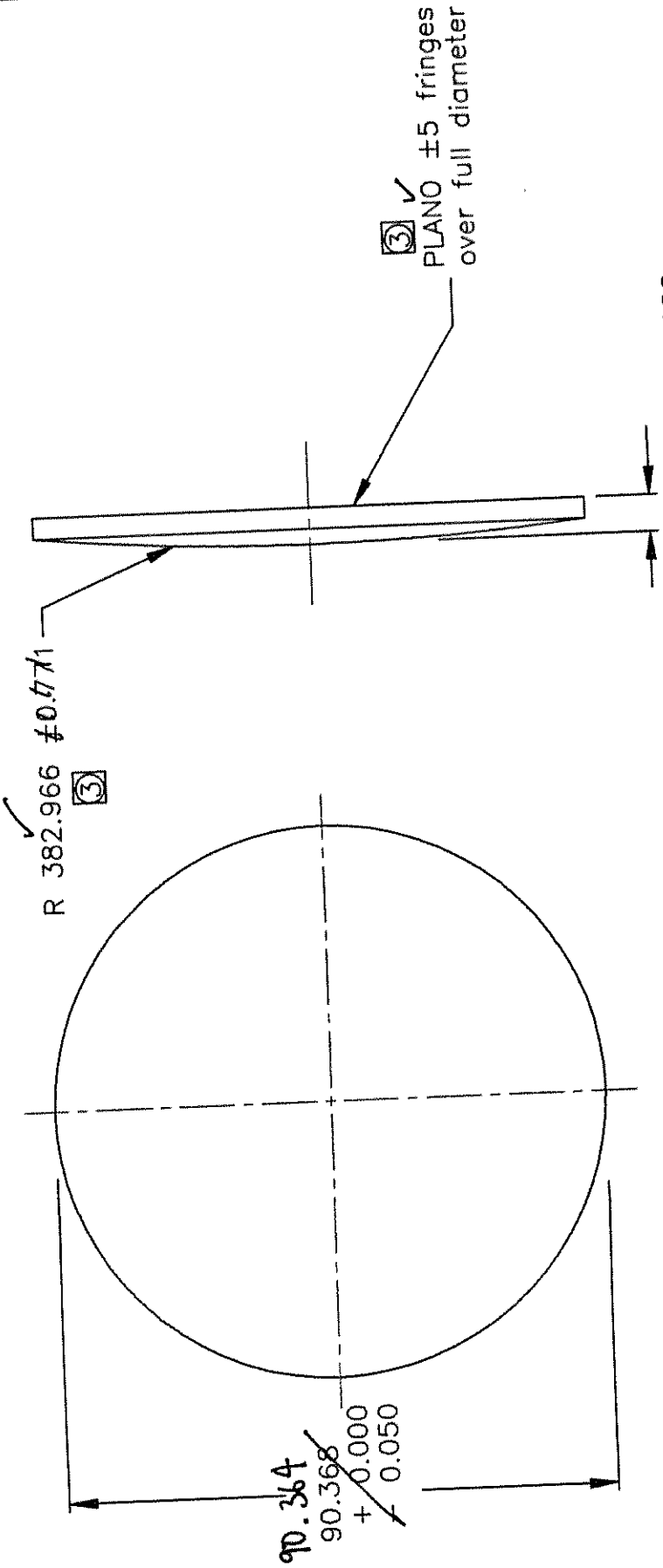


- NOTES:
- Dimensions are in millimeters
  - Material: BaF<sub>2</sub> n(587.5618nm)=1.474478 ± 0.0005  
Grain boundary free  
No visible inclusions
  - Optical Surfaces:  
Scratch dig 60/40 per MIL-0-13830A  
Figure < 1/5 wave peak-to-valley @ 632.8nm  
Micro roughness/smoothness < 20A rms  
Surface is convex sphere
  - Surface is convex sphere
  - Wedge < 0.259 degrees (TIR 100um)
  - Finish polish to edge
  - Chamfer all edges with 0.5mm face width max by 45 degrees
  - Clear aperture - 18.0 mm
  - High transmission coating for 1.0um to 2.5um - Not yet specified  
Must withstand 77K operating temperature
  - All surface dimensions are at standard Temp & Pressure
  - Radius will be fit to vendor's test plates.
  - Mark on edge of optic indicating maximum TIR.
  - Request inspection report based on final data.

DESIGNED BY: R. SARLOT	DATE: 03/08/98	PROJECT: ARIES
DRAWN BY: R. SARLOT	CHECKED BY: Don McCarthy	TITLE: Pupil Viewing Lens #2 - Cylinder Refractive Channel Barium Fluoride Substrate
APPROVED:	APPROVED:	PILOT SIZE SCALE: A None
APPROVED:	APPROVED:	DRAWING NUMBER: 10491
JOB NO.	ACTIVITY CODE:	REVISION: B
CURRENT TIME/DATE/FILE LOCATION:		
FILE NUMBER LOCATION:		

CONTACT: ROLAND SARLOT 520-626-7252  
Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7839

REVISIONS		DATE	REVISION BY	APPROVED
LTR	DESCRIPTION			
B	Removed Scale	6/16/99	R. Sarlot	



- NOTES:
- 1) Dimensions are in millimeters
  - 2) Material: LIF2 n(587.5618nm)=1.392146 ±0.0005  
Grain boundary free  
No visible inclusions
  - 3) Optical Surfaces:  
Scratch dig 60/40 per MIL-0-13830A  
Micro roughness/finish <10A rms  
Figure <16.65nm rms (0.0263 waves rms @ 632.8nm) over 1.0um - 1.0um  
Wedge < 0.032 degrees (TIR 50um) (.012 TIR @ 11um)
  - 4) Wedge < 0.032 degrees (TIR 50um) (.012 TIR @ 11um)
  - 5) Pitch polish to edge
  - 6) Chamfer all edges with 0.5mm face width max by 45 degrees
  - 7) Clear aperture - 85.00 mm
  - 8) High transmission coating for 1.0um to 5.0um -Not yet specified  
Must withstand 77K operating temperature
  - 9) All surface dimensions are at standard Temp & Pressure
  - 10) Radius fit to vendor's test plate.
  - 11) Request inspection report based on final data.

CONTACT: ROLAND SARLOT 520-626-7252  
Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659

DESIGNED BY:	DATE:	PROJECT:	REVISION:
R. SARLOT	05/08/98	ARIES	
CHECKED BY:	DATE:	TITLE:	REVISION:
Don McCarthy	03/19/99	Atmospheric Dispersion Corrector	
APPROVED:	5/11/99	Lens 1	
		LIF	
APPROVED:		PLOT SIZE:	DRAWING NUMBER:
		A	10404
ACTIVITY CODE:		SCALE:	
		None	
CURRENT TIME/DATE/FILE LOCATION:		FILE ARCHIVE LOCATION:	

DeHaven

APC L1

				INSPECTION DATA		
Customer PO# <i>P234192</i>				WO# <i>1263-01</i>	PN <i>4462</i>	Date
Full Quantity <i>1</i>		Quantity Tested <i>1</i>		Material <i>LiF</i>	<i>10404B</i>	Lot# <i>1</i>
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	<u>Diameter or Length</u>	<i>90.368</i>	<i>±.05</i>	11	Irreg. S1, Fr. or Wv.	<i>16.65 nm rms (.0263 λ rms)</i>
2	Width	—		12	Surface Quality / SD S1	<i>60/40</i>
3	Clear Aperture 1, mm	<i>85.00</i>		13	Radius S2, mm	<i>∞</i>
4	Clear Aperture 2, mm	<i>85.00</i>		14	Power S2, Fr. or Wv.	<i>5 Fr.</i>
5	SAG 1, mm	<i>2.674</i>		15	Irreg. S2, Fr. or Wv.	<i>16.65 nm rms (.0263 λ rms)</i>
6	SAG 2, mm	<i>∞</i>		16	Surface Quality / SD S2	<i>60/40</i>
7	Center Thickness, mm	<i>6.025</i>	<i>±.100</i>	17	TIR, mm	<i>50 microns</i>
8	Full Thickness, mm	—		18	Wedge, mm	
9	Radius S1, mm	<i>382.966</i>	<i>±.771</i>	19		
10	Power S1, Fr. or Wv.	—		20		
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	<i>90.364</i>					
2	—					
3	<i>85.00</i>					
4	<i>85.00</i>					
5	—					
6	—					
7	<i>5.88</i>					
8	—					
9	<i>382.966</i>					
10	—					
11	<i>&lt;.0263 λ rms over any 13 mm aperture</i>					
12	<i>&lt; 60/40</i>					
13	<i>∞</i>					
14	—					
15	<i>.076 λ rms over full piece, &lt;.0263 λ rms over any 13 mm aperture</i>					
16	<i>&lt; 60/40</i>					
17	<i>19 microns</i>					
18						
19						
20						
				QC Inspector		



- MEASURE
- Analyze
- Mask Data
- Save Data
- Load Data
- Calibrate
- Reset

Measure Cntr

Analyze Cntr

S/W Profile

Slope Mag

Slope X

Slope Y

FSP

MTF

MTF Profile

Zernikes

ISO 10110-5

SynthPringes

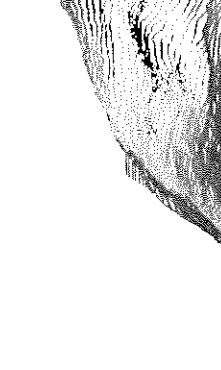
Analyze Attr

Process

Report

Units

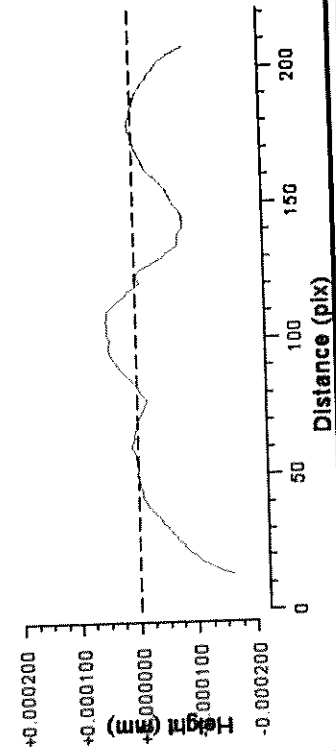
Video Monitor



+0.000107 mm  
-0.000159 211

FV 0.421 wave  
rms 0.076 wave  
Power -0.472 wave  
Size X mm  
Size Y mm

Surface/Wavefront Profile

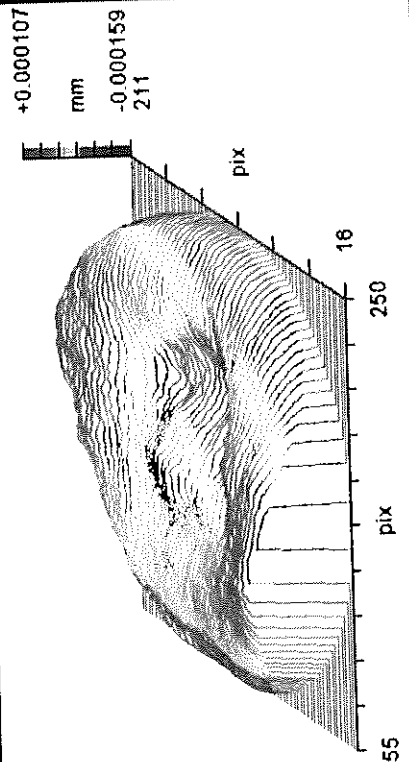


FV 0.330 wave rms 0.067 wave

Measurement Attributes

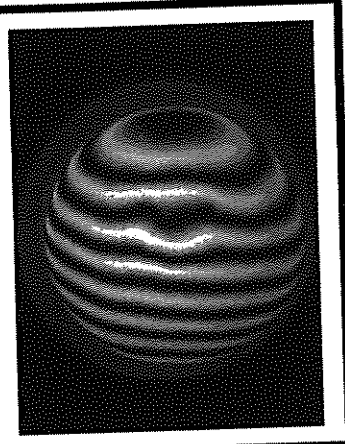
Tue Dec 14 08:19:04 1999  
P/N: 10404 B  
PO#: P234192  
90.368mm, Lens 1, LiF, Plano

Oblique Plot

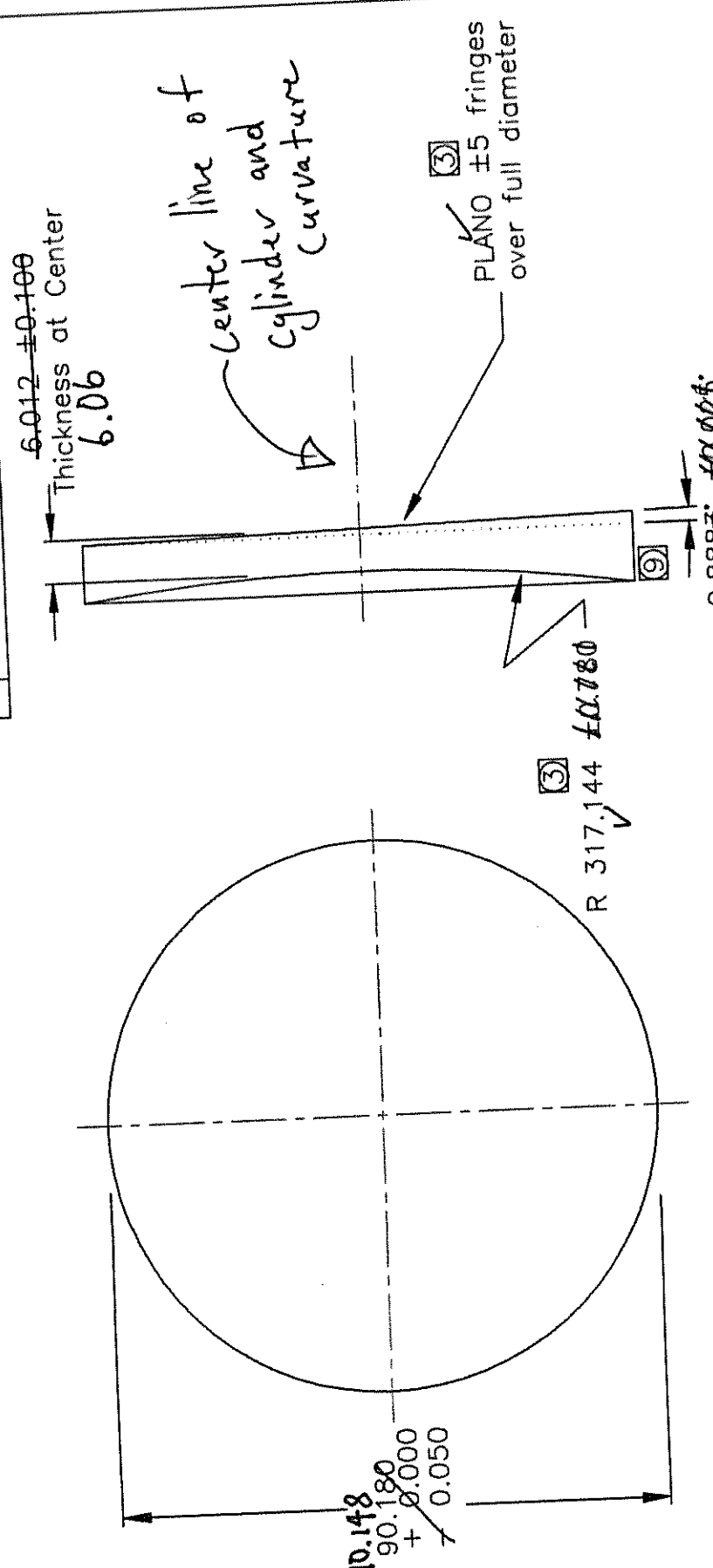


Removed: P8T TLF PWR  
Aperture OD (N): 94  
Aperture ID (N): 0  
Filter: Off  
Trimmed: 0

Zygo Zygo Intensity Map



REVISIONS	DATE	REVISED BY	APPROVED
LTR			
B	8/16/99	R. Sarlot	
Changed to negative lens, removed scale, redraw wedge			



90.148  
 90.180  
 + 0.000  
 - 0.050

R 317.144 ± 0.180

Thickness at Center  
 6.06

Center line of cylinder and curvature

PLANO ±5 fringes over full diameter

0.8883° ~~100.025°~~  
 0.8762° Wedge

UNLESS OTHERWISE SPECIFIED  
 TOLERANCES ON:  
 DECIMALS FRACTIONS ANGLES  
 .XX .XX .XX  
 AS NOTED  
 DIMENSIONS ARE IN:  
 ENGLISH METRIC X  
 MATERIAL

FINISH

1) Dimensions are in millimeters  
 2) Material: CaF2 n(587.5618nm)=1.433849 ±0.0005  
 Grain boundary free  
 No visible inclusions  
 3) Optical Surfaces:  
 ✓ Scratch dig 60/40 per MIL-0-13830A  
 Micro roughness/finish <10A rms  
 ✓ Figure <16.65nm rms (0.0263 waves rms @632.8nm)  
 4) Pitch polish to edge  
 5) Chamfer all edges with 0.5mm face width max by 45 degrees  
 6) Clear aperture - 85.00 mm  
 7) High transmission coating for 1.0um to 5.0um -Not yet specified  
 Must withstand 77K operating temperature  
 8) All surface dimensions are at standard Temp & Pressure  
 Scribe mark on edge of optic indicating extreme of wedge (greatest TIR point)  
 10) Radius fit to vendor's test plate  
 11) Request inspection report based on final data.

CONTACT: ROLAND SARLOT 520-626-7252  
 Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659

DESIGNED BY: R. SARLOT  
 DATE: 05/08/98  
 DRAWN BY: R. SARLOT  
 DATE: 03/19/99  
 CHECKED BY: D. McCarthy  
 DATE: 5/11/99  
 APPROVED:

PROJECT: ARIES  
 TITLE: Atmospheric Dispersion Corrector Lens/Prism 2  
 MATERIAL: CaF2

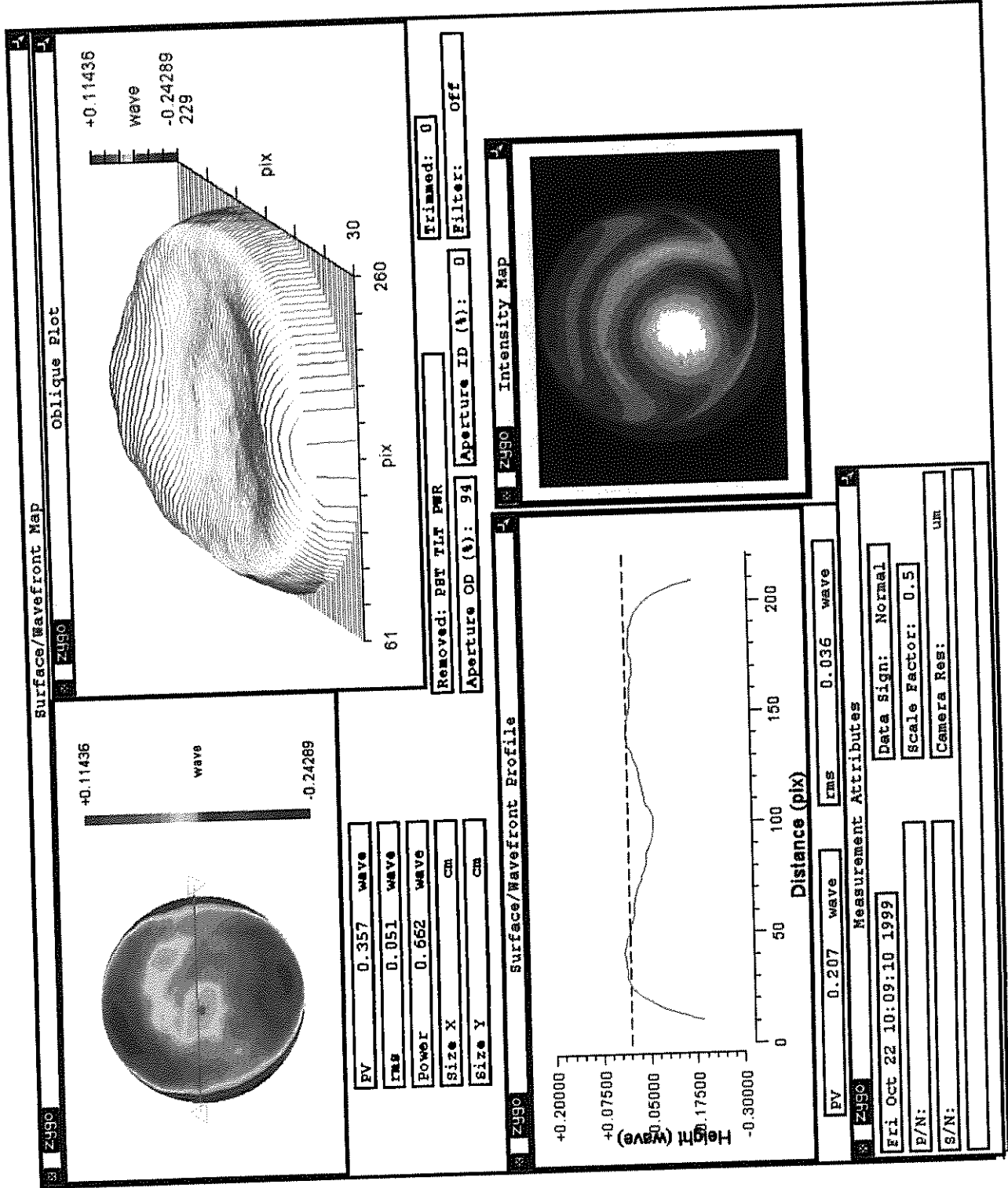
PART SIZE: A  
 SCALE: None  
 DRAWING NUMBER: 10405  
 REVISION: B

CURRENT TAG/DWG/FILE LOCATION:  
 FILE ARCHIVE LOCATION:

Approved

				INSPECTION DATA		
Customer PO# <i>P234192</i>				WO# <i>1263-02</i>	PN <i>4463</i>	Date
Full Quantity <i>1</i>		Quantity Tested <i>1</i>		Material <i>C9F2</i>	<i>10405B</i>	Lot # <i>1</i>
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	<i>90.180</i>	<i>±1.00 -1.05</i>	11	Irreg. S1, Fr. or Wv.	<i>16.65 nm rms (.0263 λ rms)</i>
2	Width			12	Surface Quality / SD S1	<i>60/40</i>
3	Clear Aperture 1, mm	<i>85.00</i>		13	Radius S2, mm	<i>∞</i>
4	Clear Aperture 2, mm	<i>85.00</i>		14	Power S2, Fr. or Wv.	<i>5 Fr.</i>
5	SAG 1, mm	<i>3.222</i>		15	Irreg. S2, Fr. or Wv.	<i>16.65 nm rms (.0263 λ rms)</i>
6	SAG 2, mm	<i>∞</i>		16	Surface Quality / SD S2	<i>60/40</i>
7	Center Thickness, mm	<i>6.012</i>	<i>±.100</i>	17	TIR, mm	<i>—</i>
8	Full Thickness, mm	<i>—</i>		18	Wedge, mm	<i>.8883° ±.025°</i>
9	Radius S1, mm	<i>317.144</i>	<i>±.780</i>	19		
10	Power S1, Fr. or Wv.	<i>—</i>		20		
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	<i>90.148</i>					
2	<i>—</i>					
3	<i>85.00</i>					
4	<i>85.00</i>					
5	<i>—</i>					
6	<i>—</i>					
7	<i>6.06</i>					
8	<i>—</i>					
9	<i>317.144</i>					
10	<i>—</i>					
11	<i>.051 λ rms over full piece, &lt;.0263 λ rms over any 13 mm aperture</i>					
12	<i>&lt; 60/40</i>					
13	<i>∞</i>					
14	<i>&lt; 5 Fr.</i>					
15	<i>.048 λ rms over full piece, &lt;.0263 λ rms over any 13 mm aperture</i>					
16	<i>&lt; 60/40</i>					
17	<i>—</i>					
18	<i>.8762°</i>					
19						
20						
				QC Inspector		

CaFa R317.144 CC

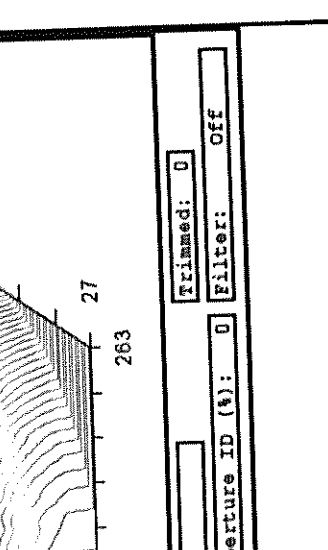


Sm Aperture Z490 Oblique Plot

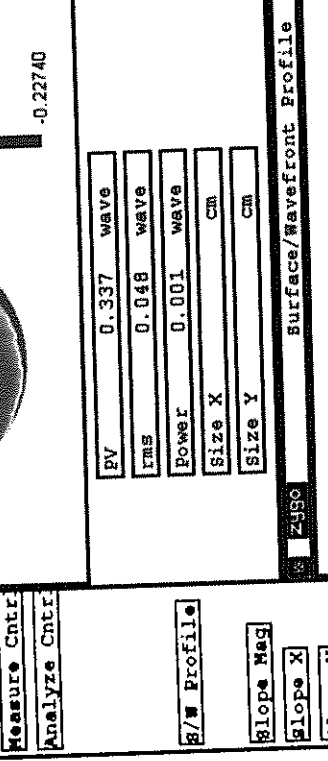
MEASURE  
 Analyze  
 Mask Data  
 Save Data  
 Load Data  
 Calibrate  
 Reset

Measure Cntr  
 Analyze Cntr

g/w Profile  
 Slope Mag  
 Slope X  
 Slope Y  
 PBF  
 MTF  
 MTF Profile  
 Zernikes  
 ISO 10110-5  
 Synchringes



Removed: PST TILT PRR  
 Aperture OD (%): 94  
 Aperture ID (%): 0  
 Filtered: 0  
 Filter: Off



FV 0.337 wave  
 rms 0.048 wave  
 Power 0.001 wave  
 Size X cm  
 Size Y cm

FV 0.194 wave rms 0.035 wave

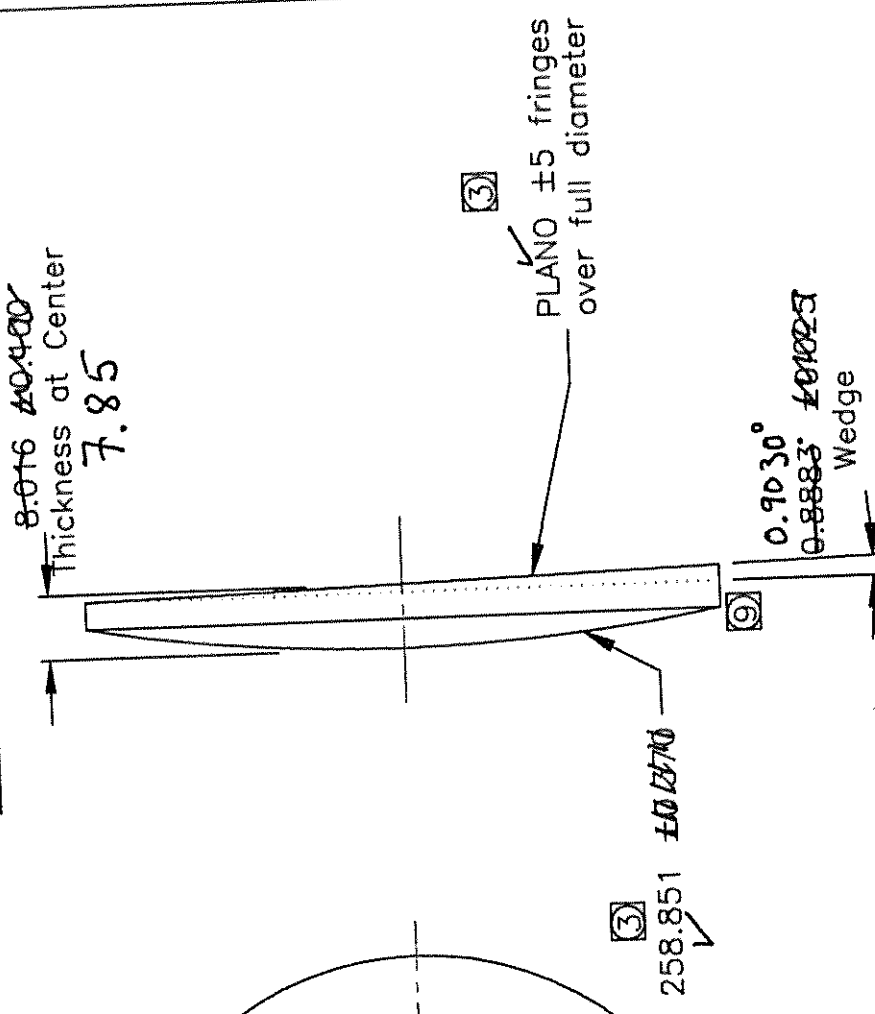
Intensity Map

Measurement Attributes

Wed Oct 27 16:42:33 1999 Data Sign: Normal  
 P/N: 10405 B Scale Factor: 0.5  
 P#: P234192 Camera Res: um  
 ADC Lens 2, Cap2, ROC 317.144

Analyze Attr  
 Process  
 Report  
 Units  
 Video Monitor

REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION			
B	Corrected wedge drawing, removed scale	8/18/99	R. Sarlot	



UNLESS OTHERWISE SPECIFIED		DATE	PROJECT
TOLERANCES ON:	FRACTIONS	05/08/99	ARIES
DECIMALS	ANGLES		
.XXX			
AS NOTED			
DIMENSIONS ARE IN:		DESIGNED BY	TITLE
ENGLISH	IN.	R. SARLOT	Atmospheric Dispersion Corrector
MATERIAL	METRIC	DRAWN BY	Lens/Prism 3
		D. McCarthy	CaF2
		APPROVED:	PLOT SIZE
			SCALE
			None
			DRAWING NUMBER
			10406
			REVISION
			B

CONTACT: ROLAND SARLOT 520-626-7252

Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659

DESIGNED BY: R. SARLOT  
DATE: 05/08/99  
PROJECT: ARIES

DRAWN BY: R. SARLOT  
DATE: 03/19/99  
TITLE: Atmospheric Dispersion Corrector

CHECKED BY: D. McCarthy  
DATE: 5/11/99  
Lens/Prism 3

APPROVED: [Signature]

APPROVED: [Signature]

APPROVED: [Signature]

FOR NO. [ ]

ACTIVITY CODE: [ ]

CURRENT TIME/DATE/FILE LOCATION: [ ]

FILE AND/OR LOCKING: [ ]

FINISH [2]

- NOTES:
- 1) Dimensions are in millimeters
  - 2) Material: CaF2 n(587.5618nm)=1.433849 ±0.0005  
Grain boundary free  
No visible inclusions
  - 3) Optical Surfaces:  
✓ Scratch dig 60/40 per MIL-0-13830A  
Micro roughness/finish <10A rms  
✓ Figure <16.65nm rms (0.0263 waves rms @ 632.8nm)
  - 4) Pitch polish to edge
  - 5) Chamfer all edges with 0.5mm face width max by 45 degrees
  - 6) Clear aperture - 85.00 mm
  - 7) High transmission coating for 1.0um to 5.0um - Not yet specified  
Must withstand 77K operating temperature
  - 8) All surface dimensions are at standard Temp & Pressure  
Scribe mark on edge of optic indicating extreme of wedge (greatest TIR point)
  - 10) Radius fit to vendor's test plate
  - 11) Request inspection report based on final data.

*Delivered*

ADC L3

				INSPECTION DATA		
Customer PO# P234192				WO# 1263-03	PN 4464	Date
Full Quantity 1		Quantity Tested 1		Material CqFe	10406 B	Lot # 1
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	90.180	$\pm 0.08$ $-0.05$	11	Irreg. S1, Fr. or Wv.	16.65 $\mu$ m rms (.0263 $\lambda$ rms)
2	Width	—		12	Surface Quality / SD S1	60/40
3	Clear Aperture 1, mm	85.00		13	Radius S2, mm	$\infty$
4	Clear Aperture 2, mm	85.00		14	Power S2, Fr. or Wv.	5 Fr
5	SAG 1, mm	3.957		15	Irreg. S2, Fr. or Wv.	16.65 $\mu$ m rms (.0263 $\lambda$ rms)
6	SAG 2, mm	—		16	Surface Quality / SD S2	60/40
7	Center Thickness, mm	8.016	$\pm 0.100$	17	TIR, mm	—
8	Full Thickness, mm	—		18	Wedge, mm	.8883° $\pm 0.025^\circ$
9	Radius S1, mm	258.851	$\pm 0.370$	19		
10	Power S1, Fr. or Wv.	—		20		
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	90.144					
2	—					
3	85.00					
4	85.00					
5	—					
6	—					
7	7.85					
8	—					
9	258.851					
10	—					
11	.034 $\lambda$ rms over full piece, < .0263 $\lambda$ rms over any 13 mm aperture					
12	< 60/40					
13	$\infty$					
14	< 5 Fr					
15	.016 $\lambda$ rms over full piece, < .0263 $\lambda$ rms over any 13 mm aperture.					
16	< 60/40					
17	—					
18	.9030°					
19						
20						
				QC Inspector		

GPI Application

---

Sm Aperture Zygo

Oblique Plot

Removed: PST TLT FWR  Trimmed: 1

Aperture OD (mm):  Filter: Off

---

MEASURE

- Analyze
- Mask Data
- Save Data
- Load Data
- Calibrate
- Reset

Measure Cntr.

Analyze Cntr.

Surface/Wavefront Profile

PV  0.102 wave  rms  0.030 wave

---

8/M Profile

Slope Mag

Slope X

Slope Y

PDF

MTF

MTF Profile

Zernikes

ISO 10110-5

Synthfringes

Intensity Map

---

Sm Aperture Zygo

Oblique Plot

Measurement Attributes

Mon Oct 25 14:36:11 1999 Data Sign: Normal

P/N: 10406 Scale Factor: 0.5

Ref: P234192 Camera Res: um

ADC Lens 3, Cat2, ROC 258.851

---

Analyze Attr

Process

Report

Units

Video Monitor



**Z490** GPI Application Surface/Wavefront Map

**8m Aperture** **Z490** **Oblique Plot**

**MEASURE**  
**Analyze**  
**Mask Data**  
**Save Data**  
**Load Data**  
**Calibrate**  
**Reset**

**Analyze Cnt**

**Slope Map**  
**Slope X**  
**Slope Y**

**PSF**  
**MTE**  
**MTF Profile**  
**Zernikes**

**ISO 10110-5**  
**Video Monitor**  
**Syntheranges**  
**Measure Att**  
**Analyze Att**  
**Process**  
**Report**  
**Units**

**Removed: PPT FIT PWR** **Trimmed: 0**  
**Aperture OD (%):** **Aperture ID (%):** **Filter: Off**

**Z490** **Z490** **Intensity Map**

**Comment: Atmos Disp Corr Prism 3, CaF2, Univ of Ariz PO# P234192**  
**Patt Number: 10406 rev B, Plano** **Se Avgs: 0** **Auto Seq**  
**Serial Number: OSI PN 4464** **Phase Res: High**  
**Instrument: Mark GPI Id 0 8N 4136 8B 0** **Auto Seq Max Count: 5**  
**Data sign: Normal** **Acc: On** **Intens Avg: 0** **Light Level Pct: 32.2**

**EV 0.005 wave**  
**ZMS 0.016 wave**

**Peak** **Valley**

**0.99** **in** **0.43** **in**

**+0.000001**  
**-0.000001**

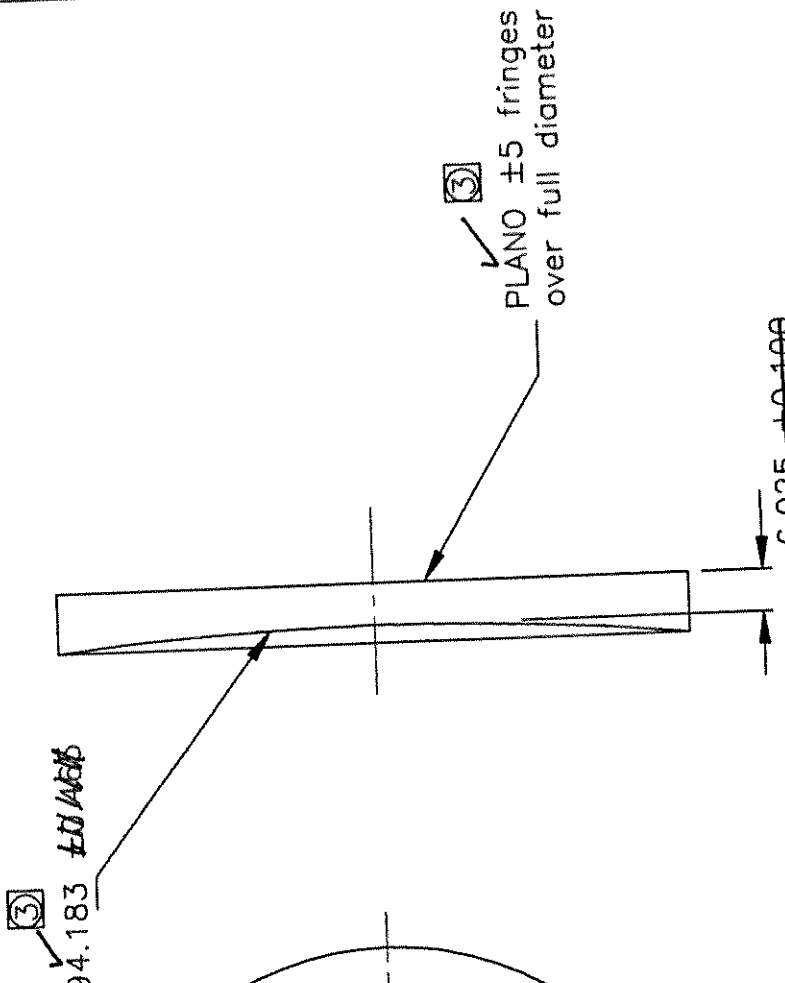
**Light (n)**

**Distance (in)**

**+0.000002**  
**+0.000001**  
**0.000000**  
**-0.000001**  
**-0.000002**

**0.00** **1.00** **2.00** **3.00** **4.00** **5.00**

REVISIONS		DATE	REVISOR	APPROVED
LTR	B	5/16/99	R. Script	
DESCRIPTION		Changed to negative lens, removed scale		



- NOTES:
- 1) Dimensions are in millimeters
  - 2) Material:  $\text{LiF}_2$   $n(587.5618\text{nm}) = 1.392146 \pm 0.0005$   
Grain boundary free  
No visible inclusions
  - 3) Optical Surfaces:  
    - ✓ Scratch dig 60/40 per MIL-0-13830A
    - Micro roughness/finish < 10A rms
    - ✓ Figure < 0.0263 waves rms @ 632.8nm **0.0183**
    - ✓ Wedge < 0.032 degrees (TIR 50um) **0.0121**
    - ✓ Chamfer all edges with 0.5mm face width max by 45 degrees
    - Clear aperture - 85.00 mm
    - Clear aperture - 1.0um to 5.0um - Not yet specified
    - High transmission coating for 77K operating temperature
    - Must withstand 77K operating temperature
  - 9) All surface dimensions are at standard Temp & Pressure
  - 10) Radius fit to vendor's test plate
  - 11) Request inspection report based on final data.

CONTACT: ROLAND SARLOT 520-626-7252  
 Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7899

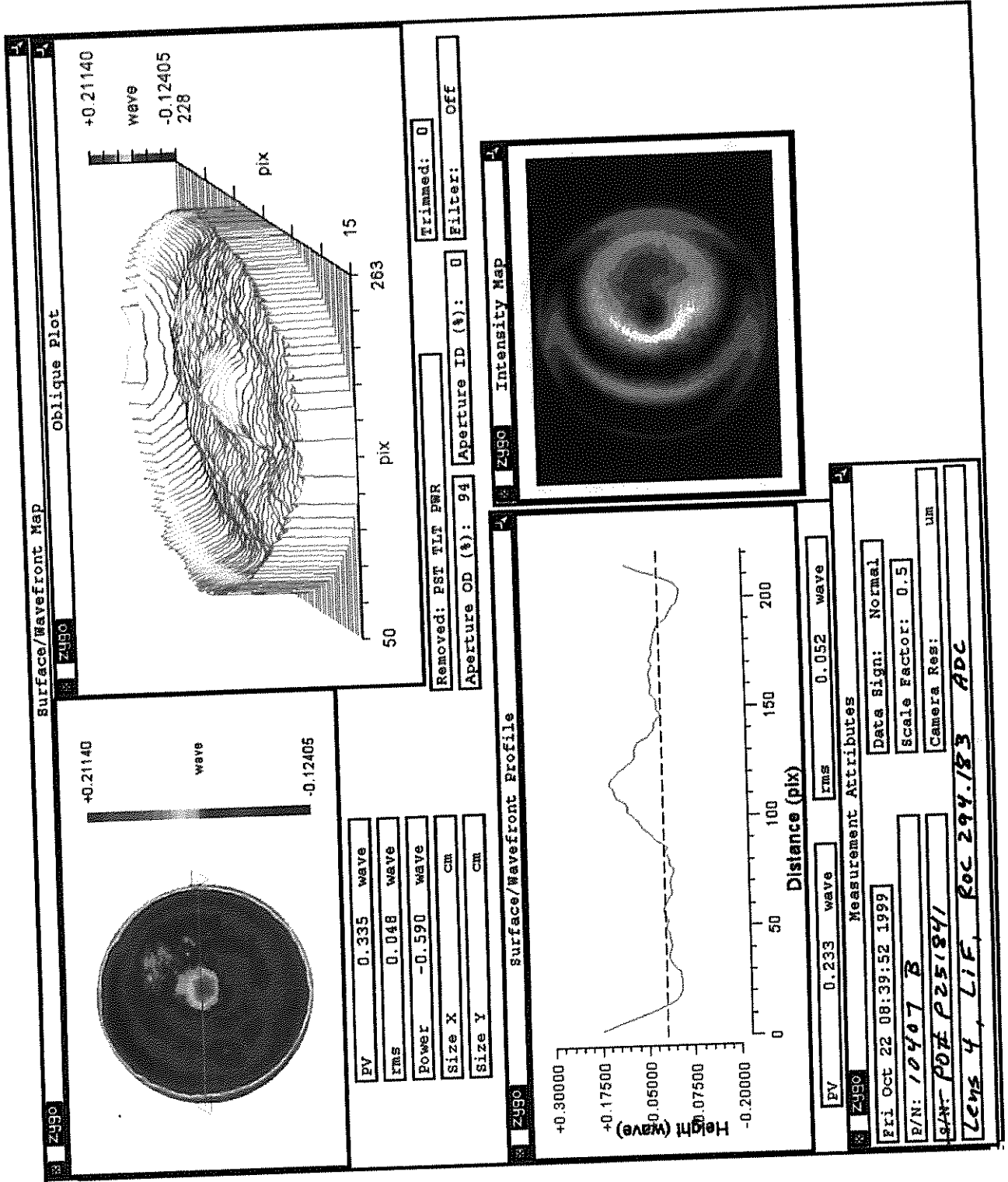
DESIGNED BY: R. SARLOT	DATE: 05/08/98	PROJECT: ARIES
DRAWN BY: R. SARLOT	DATE: 03/19/99	TITLE: Atmospheric Dispersion Corrector
CHECKED BY: D. McCarthy	DATE: 5/11/99	SCALE: None
APPROVED:		PLAT SIZE: A
APPROVED:		SCALE: None
APPROVED:		DRIVING NUMBER: 10407
JOB NO.:		REVISION: B
CURRENT TIME/DATE/FILE LOCATION:		
FILE ARCHIVE LOCATION:		

Archived

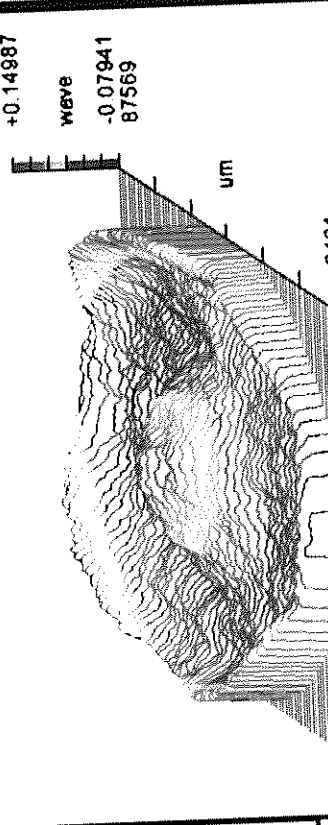
# ADC L4

				INSPECTION DATA		
Customer PO# <i>P234192</i>				WO# <i>1263-04</i>	PN <i>4465</i>	Date
Full Quantity <i>1</i>		Quantity Tested <i>1</i>		Material <i>LiF</i>	<i>10407 B</i>	Lot# <i>1</i>
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
<i>1</i>	<i>Diameter or Length</i>	<i>90.368</i>	<i>+0.000 -0.050</i>	<i>11</i>	<i>Irreg. S1, Fr. or Wv.</i>	<i>16.65 nm rms (.0263 λ rms)</i>
<i>2</i>	<i>Width</i>	<i>—</i>		<i>12</i>	<i>Surface Quality / SD S1</i>	<i>60/40</i>
<i>3</i>	<i>Clear Aperture 1, mm</i>	<i>85.00</i>		<i>13</i>	<i>Radius S2, mm</i>	<i>∞</i>
<i>4</i>	<i>Clear Aperture 2, mm</i>	<i>85.00</i>		<i>14</i>	<i>Power S2, Fr. or Wv.</i>	<i>5 Fr.</i>
<i>5</i>	<i>SAG 1, mm</i>	<i>3.491</i>		<i>15</i>	<i>Irreg. S2, Fr. or Wv.</i>	<i>16.65 nm rms (.0263 λ rms)</i>
<i>6</i>	<i>SAG 2, mm</i>	<i>∞</i>		<i>16</i>	<i>Surface Quality / SD S2</i>	<i>60/40</i>
<i>7</i>	<i>Center Thickness, mm</i>	<i>6.025</i>	<i>±.100</i>	<i>17</i>	<i>TIR, mm</i>	<i>50 microns</i>
<i>8</i>	<i>Full Thickness, mm</i>	<i>—</i>		<i>18</i>	<i>Wedge, mm</i>	
<i>9</i>	<i>Radius S1, mm</i>	<i>294.183</i>	<i>±.465</i>	<i>19</i>		
<i>10</i>	<i>Power S1, Fr. or Wv.</i>	<i>—</i>		<i>20</i>		
				ACTUAL (MEASURED)		
				Part Number		
N	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
<i>1</i>	<i>90.358</i>					
<i>2</i>	<i>—</i>					
<i>3</i>	<i>85.00</i>					
<i>4</i>	<i>85.00</i>					
<i>5</i>	<i>—</i>					
<i>6</i>	<i>—</i>					
<i>7</i>	<i>6.06</i>					
<i>8</i>	<i>—</i>					
<i>9</i>	<i>294.183</i>					
<i>10</i>	<i>—</i>					
<i>11</i>	<i>.048 λ rms over full piece, &lt;.0263 λ rms over any 13mm aperture</i>					
<i>12</i>	<i>&lt; 60/40</i>					
<i>13</i>	<i>∞</i>					
<i>14</i>	<i>&lt; 5 Fr.</i>					
<i>15</i>	<i>.044 λ rms over full piece, &lt;.0263 λ rms over any 13mm aperture.</i>					
<i>16</i>	<i>&lt; 60/40</i>					
<i>17</i>	<i>29 microns</i>					
<i>18</i>						
<i>19</i>						
<i>20</i>						
				QC Inspector		

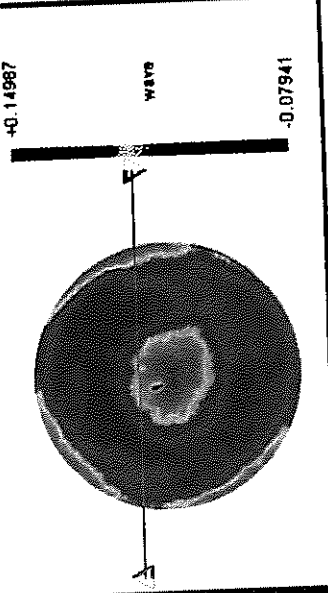
LIF R 294.183 CC



8m Aperture Zygo Zygo Oblique Plot



Removed: PRT TLT PWR  
 Aperture OD (Å): 94 Aperture ID (Å): 0 Filter: Off  
 Tilted: 0



FV 0.229 wave  
 rms 0.044 wave  
 Power 0.295 wave  
 Size X 8.5 cm  
 Size Y 8.5 cm

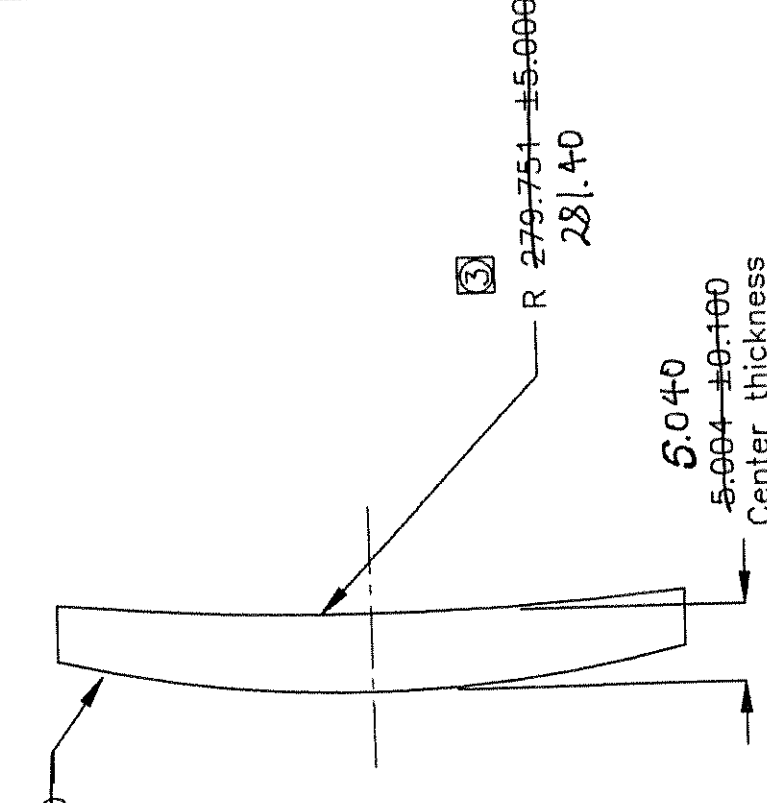
8/W Profile  
 Slope Mag  
 Slope X  
 Slope Y  
 PRF  
 MTF  
 MTF Profile  
 Zernikes  
 ISO 10110-5  
 SynchFringes

Analyze Attr  
 Process  
 Report  
 Units  
 Video Monitor

Zygo Zygo Intensity Map

Measurement Attributes  
 Wed Nov 03 08:39:23 1999 Data Sign: Normal  
 P/N: 10407 B Scale Factor: 0.5  
 PO#: P251841 Camera Res: 403.5 um  
 Lens 4, L1F, Plano

REVISIONS		
REV	DESCRIPTION	DATE
B	Entire new lens	9/3/99
C	Diameter reduced	9/9/99



DATE:	9/3/99
DESIGNED BY:	R. SARLOT
CHECKED BY:	R. SARLOT
APPROVED:	
APPROVED:	
APPROVED:	
JOB NO.:	
ACTIVITY CODE:	
DATE:	9/3/99
DESIGNED BY:	R. SARLOT
CHECKED BY:	R. SARLOT
APPROVED:	
APPROVED:	
APPROVED:	
JOB NO.:	
ACTIVITY CODE:	
DATE:	9/3/99
DESIGNED BY:	R. SARLOT
CHECKED BY:	R. SARLOT
APPROVED:	
APPROVED:	
APPROVED:	
JOB NO.:	
ACTIVITY CODE:	

CONTACT: ROLAND SARLOT 520-626-7252  
 Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7859

PROJECT: ARIES  
 TITLE: Pupil Viewing Lens #1  
 Refractive Channel  
 Cleartran

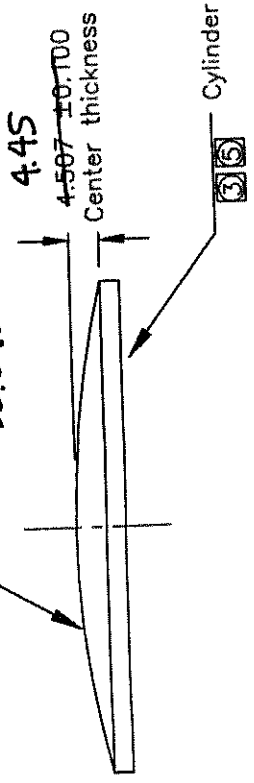
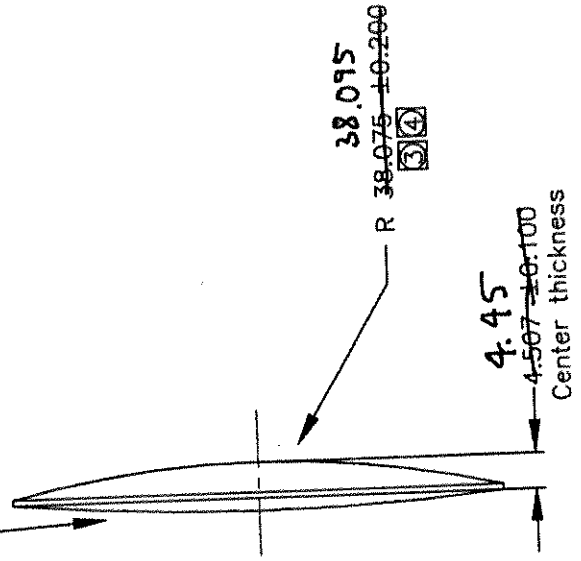
PLAT SIZE: A  
 SCALE: None  
 DRAWING NUMBER: 10490  
 REVISION: C

UNLESS OTHERWISE SPECIFIED  
 TOLERANCES ON:  
 DECIMALS FRACTIONS ANGLES  
 .XXX AS NOTED  
 DIMENSIONS ARE IN:  
 ENGLISH METRIC X  
 MATERIAL: 2  
 FINISH

- NOTES:
- Dimensions are in millimeters
  - Material:
    - ✓ Morton Cleartran  $n(587.5618\text{nm})=2.367677 \pm 0.0005$
    - Grain boundary free
    - No visible inclusions
  - Optical Surfaces:
    - ✓ Scratch dig 60/40 per MIL-0-13830A
    - Micro roughness/finish <20A rms
    - ✓ Figure <33.30nm rms (0.0526 waves rms @ 632.8nm)
    - Wedge < 0.143 degrees (TIR 75um) 0.081 CTIA 34um
  - Pitch polish to edge
  - Chamfer all edges with 0.5mm face width max by 45 degrees
  - Clear aperture - 19.0 mm
  - High transmission coating for 1.0um to 2.5um -Not yet specified  
 Must withstand 77K operating temperature
  - All surface dimensions are at standard Temp & Pressure
  - Radii are fit to vendor's test plates.
  - Request inspection report based on final data.

REV. NO.	DESCRIPTION	DATE	REVISED BY	APPROVED
B	Tolerance change on faster radius	7/27/99	R. Sarlot	

R 38.075 ±0.200  
 38.095  
 1097.75  
 (Convex)  
 R 1097.757 ±15.000  
 35



- NOTES:
- 1) Dimensions are in millimeters
  - 2) Material: BarF2 n(587.5618nm)=1.474478 ±0.0005  
Grain boundary free  
No visible inclusions
  - 3) Optical Surfaces:  
Scratch dig 60/40 per MIL-0-138-30A  
Figure < 1/5 wave peak-to-valley @ 632.8nm  
Micro roughness/smoothness < 20A rms
  - 4) Surface is convex sphere
  - 5) Surface is a cylinder with convex radius of 1097.757 in one direction
  - 6) Wedge < 0.239 degrees (TIR 100um) 0.498 (TIR 0.020 um)
  - 7) Pitch polish to edge
  - 8) Chamfer all edges with 0.5mm face width max by 45 degrees
  - 9) Clear aperture - 18.0 mm
  - 10) High transmission coating for 1.0um to 2.5um -Not yet specified  
Must withstand 77K operating temperature
  - 11) All surface dimensions are at standard Temp & Pressure
  - 12) Radii will be fit to vendor's test plates.
  - 13) Mark on edge of optic indicating maximum TIR.
  - 14) Request inspection report based on final data.

CONTACT: ROLAND SARLOT 520-626-7252

Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)821-7659

DESIGNED BY R. SARLOT	DATE 05/08/98	DRAWN BY R. SARLOT	DATE 03/19/99	PROJECT ARIES
CHECKED BY Don McCarthy	DATE 5/11/99	APPROVED:	TITLE Pupil Viewing Lens #2 - Cylinder	REVISION B
APPROVED:		APPROVED:	REFRACTIVE CHANNEL Barium Fluoride Substrate	
JOB NO.	ACTIVITY CODE:	PLAT SIZE	SCALE: None	DRAWING NUMBER 10491
CURRENT TAG/PAGE/FILE LOCATION				
FILE ARCHIVE LOCATION				



JANOS Technology, Inc.  
 HCR # 33, Box 25, Route 35  
 Townshend, Vermont 05353-7702  
 (802) 365-7714

*pupil  
viewing  
lens*

11-4-99  
 DATE

CUSTOMER Arizona U.

THIS IS TO CERTIFY THAT THE One

PIECE (S) OF Bafz Cylindrical Lens

ON OUR INVOICE # \_\_\_\_\_ CONFORMS TO ALL

CUSTOMER SPECS AND/OR PRINT # —

J.T.I. PRINT # 903176-01 Rev A

J.T.I. WORK ORDER # 903176-01

AS SPECIFIED IN YOUR PURCHASE ORDER # P25-2976

A WITNESS SAMPLE IS ENCLOSED: YES \_\_\_\_\_ NO

ADDITIONAL CERTIFICATIONS OR COMMENTS: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

B. Alwood  
 Quality Assurance <sup>Supervisor</sup> Manager



## INSPECTION DATA REPORT

Customer <i>Arizona U.</i>	P.O.No. <i>P152976</i>	Customer Part No., Rev.	J.T.I. Part No. <i>903176-01</i>	Rev. <i>A</i>
J.T.I. W.O.No. <i>903176-01</i>	Lot Size <i>1</i>	Lot No. <i>---</i>	A.Q.L (%) <i>100%</i>	
J.T.I. Inspector <i>Jim</i>	Date <i>11-4-99</i>	Description <i>BaFa</i>	Sheet of <i>1 - 2</i>	

Comments

J.T.I. S.N.	Diameter	Center Th.	Wedge (EV)	CHAMFER Bevel	R/R, S.Q.	<sup>Cylinder</sup> T.P.FI / Ineg <i>1Fa x 1Fa</i>	<sup>Side</sup> T.P.FI / Ineg <i>.4 x .4</i>
<i>1.</i>	<i>24.04mm</i> + .000 - .050mm	<i>4.507mm</i> ± .100	<i>100</i> <del>100</del> 0.020mm	<i>45° X</i> 1.250 1.500 FW	<i>51-52</i> <i>60/40</i> <i>2 60/40</i>	<i>1Fa x 1Fa</i> <sup>0.466</sup> <i>2 1Fa x 1Fa</i>	<i>.4 x .4</i> <i>1.343 Fa</i>
						<i>2 60/40</i> <i>2 1Fa x ?</i>	

*From Dwg*  
*Marks on high side of side*



# INSPECTION DATA REPORT

Customer <i>Arizona U.</i>	P.O.No. <i>P252976</i>	Customer Part No., Rev.	J.T.I. Part No. <i>903176-01</i>	Rev. <i>A</i>
J.T.I. W.O.No. <i>903176-01</i>	Lot Size <i>1</i>	Lot No. <i>—</i>	A.Q.L (%) <i>100%</i>	
J.T.I. Inspector <i>SM.</i>	Date <i>11-4-99</i>	Description <i>Bafe</i>	Sheet of <i>2-2</i>	

Comments

J.T.I. S.N.	Radius R <sub>1</sub>	Radius R <sub>2</sub>				
	<i>1097.757 ±15.000</i>	<i>38.075 ±1.200</i>				
<i>1.</i>	<i>1097.757</i>	<i>38.075</i>				

Source: JANOS Technology INC.

# Contour

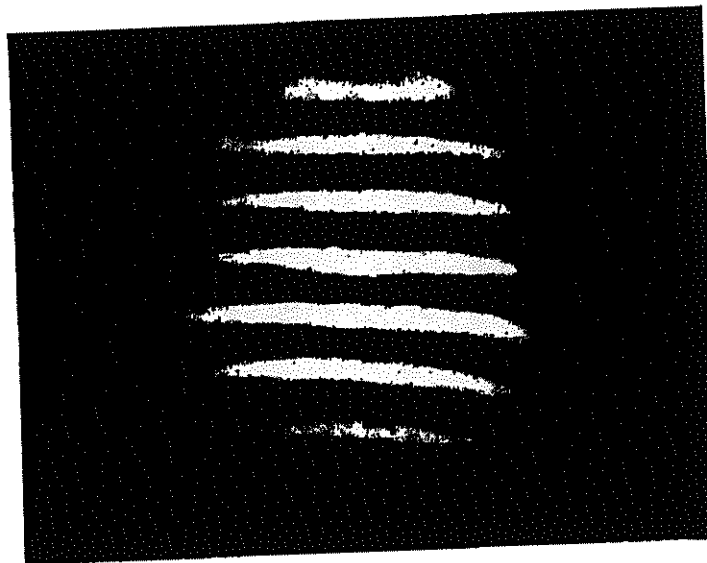
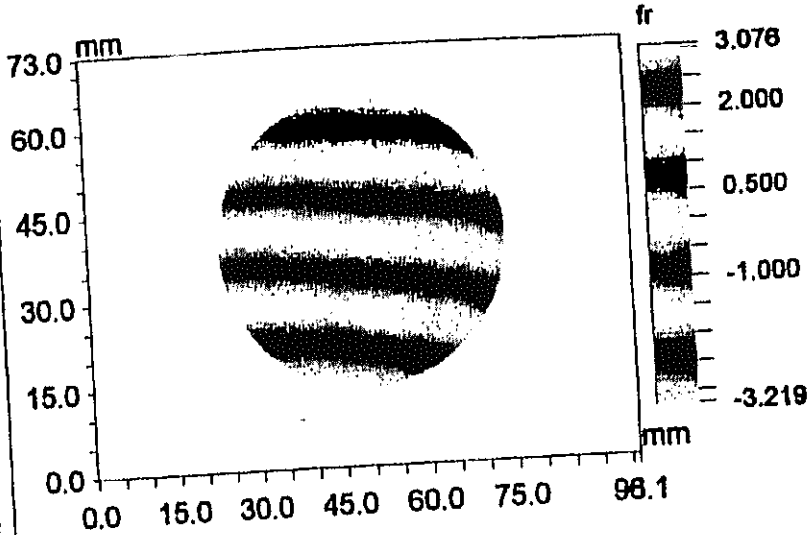
Note: BAF<sub>2</sub>

Date: 11/03/99  
 Time: 12:03:18  
 WL: 632.800 nm  
 Wedge: 0.50 wv/fr  
 Size: 368 X 240  
 Pupil: 100.0 %

**Surface Stats:**  
 RMS: 0.058 fr  
 PV: 0.343 fr

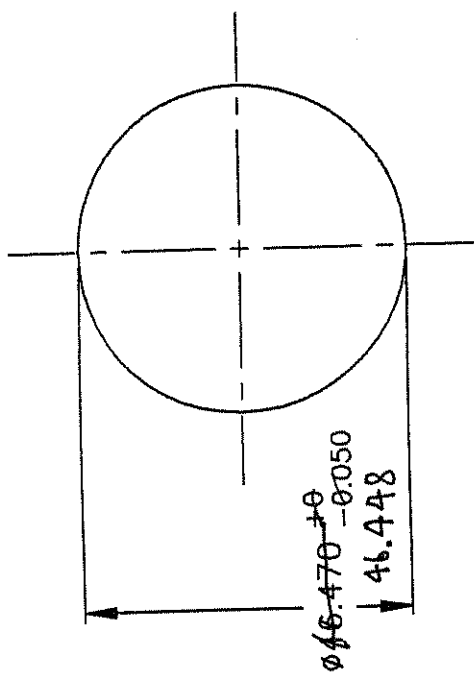
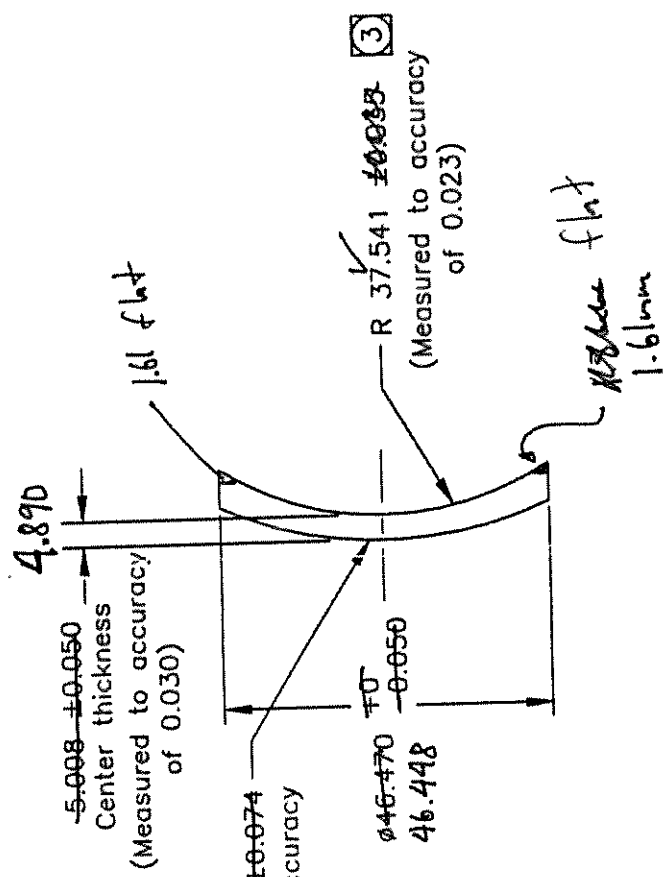
**Terms Removed:**  
 Tilt  
 Filtering: None  
 Restore: No  
 Ref Sub: No

## Surface Data



CX R = 38.095 mm

REVISIONS		
LTR	DESCRIPTION	DATE



- 1) Dimensions are in millimeters
- 2) Material:  
Schott SF6 n(587.5618nm)=1.805180 ±0.0005  
Grade 2, B1, "Normal quality" striae
- 3) Optical Surfaces:  
Scratch dig 60/40 per MIL-0-13830A  
Micro roughness/finish <10A rms  
Figure <16.65nm rms  
Wedge < 0.0185 degrees (TIR 15um) 0.0086° (TIR 7um)
- 4) Wedge polish to edge
- 5) Chamfer all edges with 0.5mm face width max by 45 degrees
- 6) Clear aperture - 42.0 mm diameter
- 7) High transmission coating for 1.0um to 2.8um - Not yet specified  
Must withstand 77K operating temperature
- 8) All surface dimensions are at standard Temp & Pressure
- 9) Inspection report requested for all measured values.
- 10) Radii fit to vendor's test plates.

CONTACT: ROLAND SARLOT 520-626-7252  
Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659

UNLESS OTHERWISE SPECIFIED	DATE	PROJECT	REVISION
TOLERANCES ON:	05/08/98	ARIES	
DIMENSIONAL			
FRACTIONAL			
DECIMALS			
ANGLES			
AS NOTED			
XX			
XXX			
DIMENSIONS ARE IN:			
ENGLISH			
METRIC			
MATERIAL			
2			
FINISH			
DESIGNED BY	DATE	PROJECT	REVISION
R. SARLOT	03/19/98	ARIES	
CHECKED BY			
D. McCarthy	7/27/98		
APPROVED:			
APPROVED:			
APPROVED:			
JOB NO.	ACTIVITY CODE	SCALE	DRAWING NUMBER
		A None	10478
			B
CURRENT TIME/DATE/FILE LOCATION			
FILE ABOVE LOCATION			

A. H. H. H. H. H.

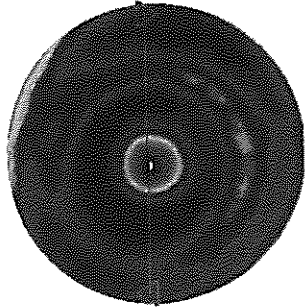
# L1 Collimating Lens

				INSPECTION DATA		
Customer PO# <b>P251841</b>				WO# <b>1289-01</b>	PN <b>4490</b>	Date
Full Quantity		Quantity Tested	<b>1</b>	Material <b>SF-6</b>	<b>10478</b>	Lot # <b>1</b>
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	<b>46.470</b>	$\pm .000$ <b>-.050</b>	11	Irreg. S1, Fr. or Wv.	<b>16.65 <math>\mu</math>m RMS</b>
2	Width			12	Surface Quality / SD S1	<b>60/40</b>
3	Clear Aperture 1, mm			13	Radius S2, mm	<b>37.541</b>
4	Clear Aperture 2, mm			14	Power S2, Fr. or Wv.	<b>-</b>
5	SAG 1, mm			15	Irreg. S2, Fr. or Wv.	<b>16.65 <math>\mu</math>m RMS</b>
6	SAG 2, mm			16	Surface Quality / SD S2	<b>60/40</b>
7	Center Thickness, mm	<b>5.008</b>	<b>+/- .050</b>	17	TIR, mm	<b>15 <math>\mu</math>m</b>
8	Full Thickness, mm			18	Wedge, mm	
9	Radius S1, mm	<b>50.470</b>	<b>+/- .074</b>	19	<b>Flat</b>	<b>1.61 mm</b>
10	Power S1, Fr. or Wv.			20	<b>FD</b>	<b>43.23</b>
				21	<b>⊙ concentricity</b>	<b>-</b>
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	<b>46.448</b>					
2						
3						
4						
5						
6						
7	<b>4.890</b>	<b>← sorry Roland, I converted wrong and used range from .191 → .195</b>				
8						
9	<b>50.52</b>				<b>(4.85)</b>	<b>(4.95)</b>
10						
11						
12	<b>&lt; 60/40</b>					
13	<b>37.541</b>					
14						
15						
16	<b>&lt; 60/40</b>					
17	<b>7 microns</b>					
18						
19	<b>1.61 mm</b>					
20	<b>43.23</b>					
21	<b>4 microns</b>					
				QC Inspector		

GPI Application  
Surface/Wavefront Map

9m Aperture

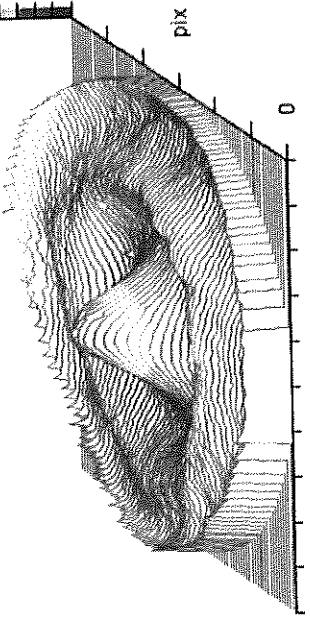
Z490



+0.000075 mm  
-0.000034 mm

Oblique Plot

Z490



+0.000075 mm  
-0.000034 mm

MEASURE

Analyze

Mask Data

Save Data

Load Data

Calibrate

Reset

Measure Cntr

Analyze Cntr

Removed: P8T VLT P8R

Aperture ID (%):

Aperture OD (%):

Trimmed: 1

Filter: Off

S/W Profile

Slope Mag

Slope X

Slope Y

P8T

MTE

MTE Profile

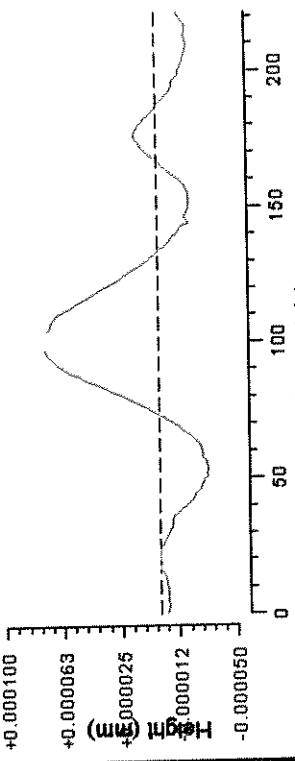
Zernikes

ISO 10110-5

SynthFringes

surface/Wavefront Profile

Z490



PV 0.172 wave

RMS 0.025 wave

Power -0.463 wave

Size X mm

Size Y mm

PV 0.167 wave

RMS 0.043 wave

Analyze Attr

Process

Report

Units

Video Monitor

Measurement Attributes

Z490

Thu Dec 09 18:03:48 1999

P/N: 10478 B

PO#: P251841

Refractive Collimator, Lens 1, ROC 50.52

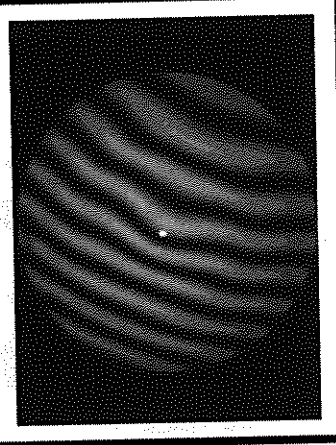
Data Sign: Normal

Scale Factor: 0.5

Camera Res: um

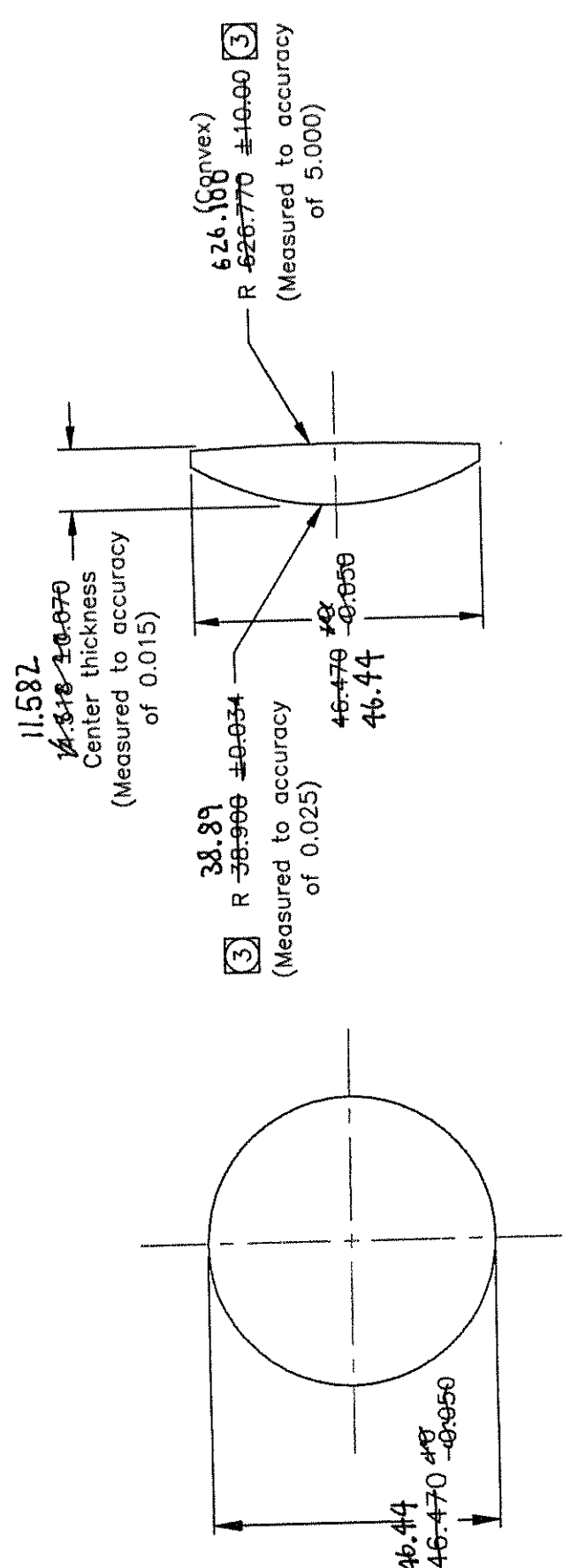
Intensity Map

Z490



*Roland - Forgot to turn on aperture. Measurement is of full surface.  
Mariano*

REVISIONS		
LTR	DESCRIPTION	DATE
C	Reduced diameter	9/9/99
		REVISOR: R.Sarfot
		APPROVED:



- 1) Dimensions are in millimeters
- 2) Material: BaF2 n(587.5618nm)=1.474478 +0.00003  
Grain boundary free  
No visible inclusions
- 3) Optical Surfaces:  
✓ Scratch dig 60/40 per MIL-0-13830A  
Micro roughness/finish <10A rms  
Figure <16.65mm rms
- 4) Wedge < 0.0244 degrees (TIR 20um) 0.0173° (TIR 14um)
- 5) Pitch polish to edge
- 6) Chamfer all edges with 0.5mm face width max by 45 degrees
- 7) Clear aperture - 40.0 mm
- 8) High transmission coating for 1.0um to 2.8um -Not yet specified  
Must withstand 77K operating temperature
- 9) All surface dimensions are at standard Temp & Pressure
- 10) Inspection report requested based on all measured data.
- 11) Radii fit to vendor's test plates.

CONTACT: ROLAND SARFOT AT 520-626-7252  
Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659

DESIGNED BY: R. SARFOT	DATE: 05/08/98	CATEGORY:
DRAWN BY: R. SARFOT	CHECKED BY: D. McCarthy	PROJECT: ARIES
APPROVED:	APPROVED:	TITLE: REFRACTIVE COLLIMATOR LENS #2
APPROVED:	APPROVED:	PLAT SIZE: A
APPROVED:	APPROVED:	SCALE: None
JOB NO.:	ACTIVITY CODE:	DRAWING NUMBER: 10479
CURRENT TIME/PART/FILE LOCATION:	FILE ARCHIVE LOCATION:	REVISION: C

Delivered

L2 Collimating lens

				INSPECTION DATA		
Customer PO# P251841				WO# 1289-02	PN 4491	Date
Full Quantity 1		Quantity Tested 1		Material BaF2	10479	Lot # 1
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	46.470	+0.00 -0.05	11	Irreg. S1, Fr. or Wv.	16.65 um rms
2	Width			12	Surface Quality / SD S1	< 60/40
3	Clear Aperture 1, mm			13	Radius S2, mm	626.77 +/- 10.00
4	Clear Aperture 2, mm			14	Power S2, Fr. or Wv.	—
5	SAG 1, mm			15	Irreg. S2, Fr. or Wv.	16.65 um rms
6	SAG 2, mm			16	Surface Quality / SD S2	< 60/40
7	Center Thickness, mm	11.518	+/- .070	17	TIR, mm	20 microns
8	Full Thickness, mm			18	Wedge, mm	
9	Radius S1, mm	38.90	+/- .034	19		
10	Power S1, Fr. or Wv.	—		20		
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	46.44					
2						
3						
4						
5						
6						
7	11.582					
8						
9	38.89					
10						
11						
12	< 60/40					
13	626.10					
14						
15						
16	< 60/40					
17	14 microns					
18						
19						
20						
				QC Inspector		



**Zygo** GPI Application  
Surface/Wavefront Map

**Sm Aperture** Zygo

**MEASURE**  
Analyze  
Mask Data  
Save Data  
Load Data  
Calibrate  
Reset

**Measure Cntr**  
Analyze Cntr

**S/W Profile**  
Slope Mag  
Slope X  
Slope Y

**ISO 10110-5**  
SynthFringes

**Analyze Attr**  
Process  
Report  
Units  
Video Monitor

**Oblique Plot**  
Zygo

**Surface/Wavefront Profile**  
Zygo

**Intensity Map**  
Zygo

**Removed: PST TLT FWR** Trimmed: 0  
**Aperture OD (%):** Aperture ID (%): Filter: Off

PV	0.252	wave
rms	0.035	wave
Power	-0.927	wave
Size X	80.8	mm
Size Y	71.1	mm

**Measurement Attributes**  
Zygo

Data Sign:	Normal
Scale Factor:	0.5
Camera Res:	439.0 um
Refractive Collimator, Lens 2, ROC	625.8

**PV** 0.180 wave rms 0.029 wave

**Tue Dec 07 16:39:50 1999**  
P/N: 10479 C  
PO#: P251841

*Reload - Aperture off - Full surface measurement. Maxime*

**GPI Application**  
Surface/Wavefront Map

Zygo

**Surface/Wavefront Profile**

Distance (pix)

PV 0.289 wave  
RMS 0.048 wave  
Power -0.031 wave  
Size X mm  
Size Y mm

**Intensity Map**

**Oblique Plot**

**Measurement Attributes**

Thu Dec 09 18:46:10 1999  
P/N: 10479 C  
PO#: P251641  
Refractive Collimator, Lens 2, 38.89 ROC

**Surface/Wavefront Map**

**Measurement Attributes**

Data sign: Normal  
Scale Factor: 0.5  
Camera Res: um

**Measurement Attributes**

Removed: PST TILT PWR  
Aperture OD (%):  
Aperture ID (%):  
Trimmed: 1  
Filter: Off

**Measurement Attributes**

PV 0.236 wave  
RMS 0.041 wave

**Measurement Attributes**

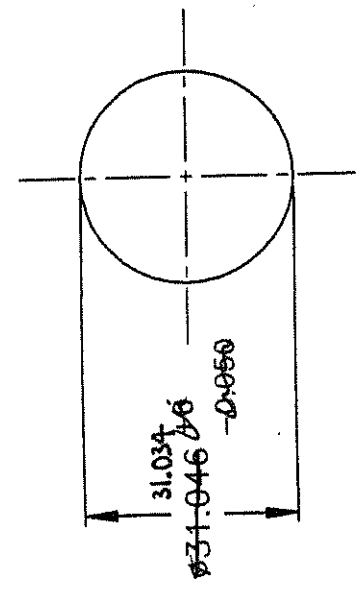
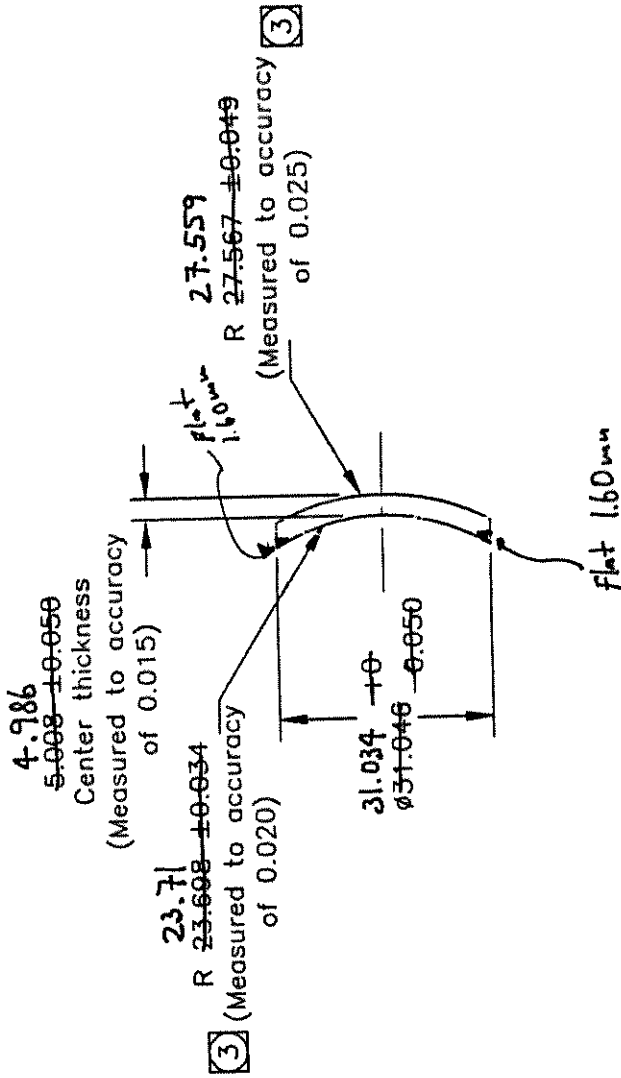
ISO 10110-5  
SynchFringes

**Measurement Attributes**

Analyze Attr  
Process  
Report  
Units  
Video Monitor

*Round - operation off. taking full surface measurement. Machine*

REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION			



- 1) Dimensions are in millimeters
- 2) Material:
  - ✓ Schott SF6  $n(587.5618\text{nm}) = 1.805180 \pm 0.0005$
  - Grade 2, B1, "Normal quality" striae
- 3) Optical Surfaces:
  - ✓ Scratch dig 60/40 per MIL-0-13830A
  - Micro roughness/finish < 10A rms
  - 0 Figure < 16.65nm rms
  - 4) Wedge < 0.0286 degrees (TIR 15um) 0.022 (TIR 12um)
  - 5) Pitch polish to edge
  - 6) Chamfer all edges with 0.5mm face width max by 45 degrees
  - 7) Clear aperture - 26.0 mm
  - 8) High transmission coating for 1.0um to 2.8um - Not yet specified
  - Must withstand 77K operating temperature
  - 9) All surface dimensions are at standard Temp & Pressure
  - 10) Request inspection report based on all measured data.
  - 11) Radii fit to vendor's test plates.

CONTACT: ROLAND SARLOT 520-626-7252  
 Stewart Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7859

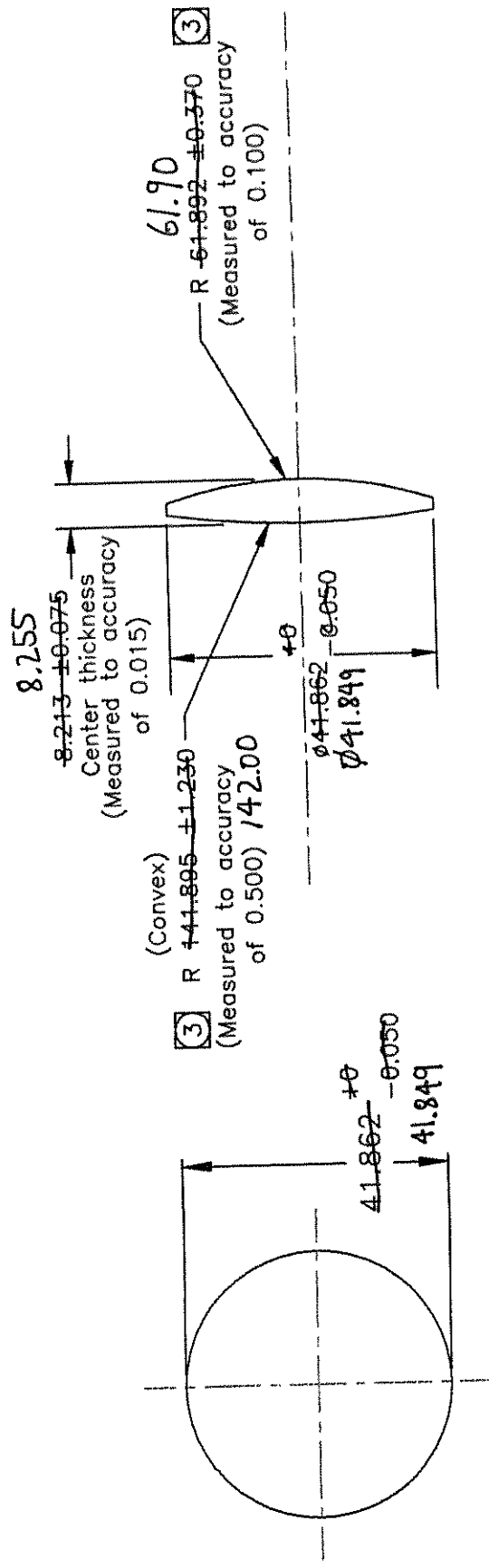
DESIGNED BY: R. SARLOT	DATE: 05/09/98	CATEGORY:	PROJECT: ARIES
DRAWN BY: R. SARLOT	CHECKED BY: D. McCarthy	DATE: 03/19/99	TITLE: REFRACTIVE COLLIMATOR LENS #3
APPROVED:	APPROVED:	APPROVED:	PLANT SIZE SCALE: A 1-1
APPROVED:	APPROVED:	APPROVED:	DRAWING NUMBER: 10480
JOB NO.:	ACTIVITY CODE:	REVISION:	B
CURRENT TIME/DATE/FILE LOCATION:			
FILE ARCHIVE LOCATION:			

Delivered

L3 Collimating lens

				INSPECTION DATA		
Customer PO# <i>P251841</i>				WO# <i>1289-03</i>	PN <i>4492</i>	Date
Full Quantity <i>1</i>		Quantity Tested <i>1</i>		Material <i>SF6</i>	<i>10480</i>	Lot # <i>1</i>
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	<u>Diameter or Length</u>	<i>31.046</i>	<i>+1.00 -0.05</i>	11	Irreg. S1, Fr. or Wv.	<i>16.65 nm rms</i>
2	Width			12	Surface Quality / SD S1	<i>60-40</i>
3	Clear Aperture 1, mm	<i>26.0</i>		13	Radius S2, mm	<i>27.567 ±1.049</i>
4	Clear Aperture 2, mm	<i>26.0</i>		14	Power S2, Fr. or Wv.	<i>—</i>
5	SAG 1, mm			15	Irreg. S2, Fr. or Wv.	<i>16.65 nm rms</i>
6	SAG 2, mm			16	Surface Quality / SD S2	<i>60-40</i>
7	Center Thickness, mm	<i>5.008</i>	<i>±1.05</i>	17	TIR, mm	<i>15 microns</i>
8	Full Thickness, mm			18	Wedge, mm	
9	Radius S1, mm	<i>23.698</i>	<i>±1.034</i>	19	<i>Flat</i>	<i>1.60 ref.</i>
10	Power S1, Fr. or Wv.	<i>—</i>	<i>—</i>	20		
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	<i>31.034</i>					
2						
3						
4						
5						
6						
7	<i>4.986</i>					
8						
9	<i>23.71</i>					
10						
11						
12	<i>&lt; 60-40</i>					
13	<i>27.559</i>					
14						
15						
16	<i>&lt; 60-40</i>					
17	<i>12 microns</i>					
18						
19	<i>1.60 mm</i>					
20						
				QC Inspector		

REVISIONS		
LTR	DESCRIPTION	DATE
C	Reduced diameter	9/9/99 R.Sariot



NOTES:  
 1) Dimensions are in millimeters

2) Material:  
 ✓ BaF2 n(587.5618nm)=1.474478 ±0.00003  
 Grain boundary free  
 No visible inclusions

3) Optical Surfaces:  
 ✓ Scratch dig 60/40 per MIL-O-13830A  
 Micro roughness/finish <10A rms  
 Figure <16.65nm rms

4) Wedge < 0.0272 degrees (TIR 20um) 0.022 (TIR 16um)  
 5) Pitch polish to edge  
 6) Chamfer all edges with 0.5mm face width max by 45 degrees  
 7) Clear aperture - 35.0 mm diameter  
 8) High transmission coating for 1.0um to 2.8um -Not yet specified  
 Must withstand 77K operating temperature  
 9) All surface dimensions are at standard Temp & Pressure  
 10) Request inspection report based on all final measured data.  
 11) Radii fit to vendor's test plates.

DESIGNED BY: R. SARLOT  
 DATE: 05/08/98  
 DRAWING NUMBER: ARIES  
 CHECKED BY: D. McCarthy  
 DATE: 03/19/99  
 TITLE: F/15 IMAGER LENS #1  
 APPROVED BY: [Signature]  
 DATE: 7/27/98  
 ACTIVITY CODE: A  
 SCALE: None  
 DRAWING NUMBER: 10481  
 REVISION: C

CONTACT: ROLAND SARLOT 520-626-7252  
 Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)821-7659

UNLESS OTHERWISE SPECIFIED	
TOLERANCES ON:	FINISHES AND ANGLES
.XXX AS NOTED	
DIMENSIONS ARE IN: ENGLISH - METRIC X	
MATERIAL	
2	
FINISH	

Devised

f115 L1

				INSPECTION DATA		
Customer PO#				WO# 1289-04	PN 4493	Date
Full Quantity /				Quantity Tested 1	Material BaF2	10481 Lot # 1
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	41.862	+0.00 -0.05	11	Irreg. S1, Fr. or Wv.	16.65 um rms
2	Width			12	Surface Quality / SD S1	60-40
3	Clear Aperture 1, mm	35.0		13	Radius S2, mm	61.892 +/- .370
4	Clear Aperture 2, mm	35.0		14	Power S2, Fr. or Wv.	—
5	SAG 1, mm			15	Irreg. S2, Fr. or Wv.	16.65 um rms
6	SAG 2, mm			16	Surface Quality / SD S2	60-40
7	Center Thickness, mm	8.213	+/- .075	17	TIR, mm	20 microns
8	Full Thickness, mm			18	Wedge, mm	
9	Radius S1, mm	141.895	+/- 1.230	19		
10	Power S1, Fr. or Wv.	—	—	20		
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	41.849					
2						
3						
4						
5						
6						
7	8.255					
8						
9	142.00					
10						
11						
12	< 60-40					
13	61.90					
14						
15						
16	< 60-40					
17	16 microns					
18						
19						
20						
				QC Inspector		

GPI Application  
Surface/Wavefront Map

**Sm Aperture** Z490

MEASURE
Analyze
Mask Data
Save Data
Load Data
Calibrate
Reset

Measure Cntrl  
Analyze Cntrl

**Oblique Plot** Z490

Removed: PST TLT PFR  
Aperture ID (A):  
Aperture OD (A):  
Trimmed: 1  
Filter: Off

**Surface/Wavefront Profile** Z490

FV	0.348	wave
rms	0.043	wave
Power	-0.010	wave
Size X	mm	
Size Y	mm	

**Intensity Map** Z490

**Measurement Attributes** Z490

Thu Dec 09 18:17:11 1999	Data Sign: Normal
P/N: 10481 C	Scale Factor: 0.5
POF: P251841	Camera Res: um
F/15 Imager, Lens 1, 61.90 ROC	

**ISO 10110-5**

SynthFringes

Analyze Attr

Process

Report

Units

Video Monitor

*Round - aperture not turned on. Taking measurement of full surface.*

GPI Application  
Surface/Wavefront Map

2490 2490

Sm Aperture

MEASURE  
Analyze  
Mask Data  
Save Data  
Load Data  
Calibrate  
Reset

Measure Cntr  
Analyze Cntr

S/W Profiles  
Slope Mag  
Slope X  
Slope Y  
PSF  
MTF  
MTF Profile  
Zernikes  
ISO 10110-5  
SynchFringes

Analyze Attr  
Process  
Report  
Units  
Video Monitor

2490

Oblique Plot

+0.000077 mm  
-0.000093 158

0 267 pix

52 pix

Removed: PSF TLT ERR  
Aperture ID (s):  
Aperture OD (s):  
Trimmed: 1  
Filter: Off

2490 Intensity Map

Surface/Wavefront Profile

2490

PV 0.267 wave  
RMS 0.053 wave  
Power -0.096 wave  
Size X mm  
Size Y mm

+0.000100  
+0.000050  
+0.000000  
-0.000050  
-0.000100

Distance (pix)

0 50 100 150 200

PV 0.099 wave rms 0.024 wave

2490 Measurement Attributes

Wed Dec 08 10:53:11 1999  
P/N: 10481 C  
P/N: 10481 C  
Scale Factor: 0.5  
Camera Res: um

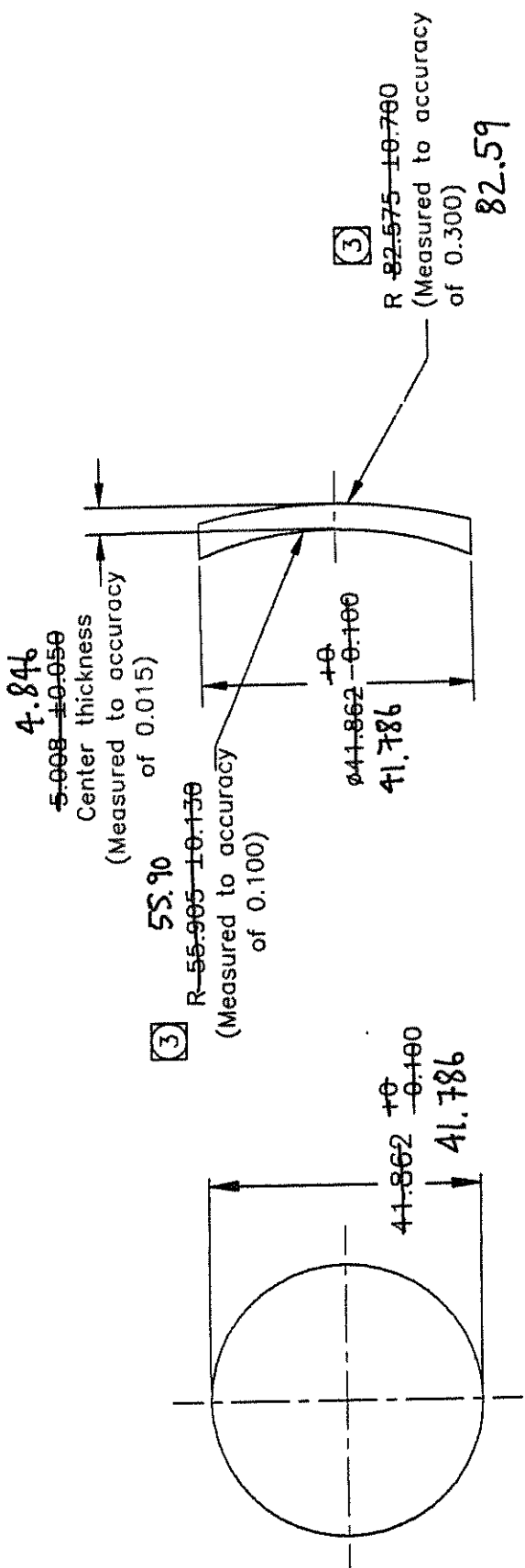
Data Sign: Normal  
Scale Factor: 0.5  
Camera Res: um

F/15 Imager Lens 1, Bar2, 141.695 ROC

*Robert - forgot to turn aperture on. Taking full surface measurement.  
Maureen*



REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION			



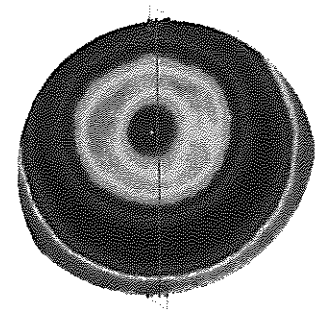
- NOTES:
- 1) Dimensions are in millimeters
  - 2) Material:
    - ✓ Schott SF6  $n(587.5618\text{nm})=1.805180 \pm 0.0005$
    - Grade 2, B1, "Normal quality" striae
  - 3) Optical Surfaces:
    - ✓ Scratch dig 60/40 per MIL-0-13830A
    - Micro roughness/finish <10A rms
    - ✓ Figure <16.65nm rms
    - ✓ Wedge < 0.0274 degrees (TIR 20um) 0.011° (TIR 8um)
  - 4) Pitch polish to edge
  - 5) Chamfer all edges with 0.5mm face width max by 45 degrees
  - 6) Clear aperture - 35.0 mm
  - 7) High transmission coating for 1.0um to 2.8um - Not yet specified
  - 8) Must withstand 77K operating temperature
  - 9) All surface dimensions are at standard Temp & Pressure
  - 10) Inspection report based on all measured data
  - 11) Radii fit to vendor's test plates.

Steward Observatory, University of Arizona 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659		
DESIGNED BY: R. SARLOT	DATE: 05/04/98	CATEGORY:
DRAWN BY: R. SARLOT	PROJECT: ARIES	
CHECKED BY: D. McCarthy	DATE: 7/27/98	TITLE: F/15 IMAGER LENS #2
APPROVED:		
APPROVED:		
APPROVED:		
JOB NO.:	SCALE: None	DRAWING NUMBER: 10482
ACTIVITY CODE:		REVISION: B
CURRENT TIME/DATE/FILE LOCATION:		
FILE ARCHIVE LOCATION:		

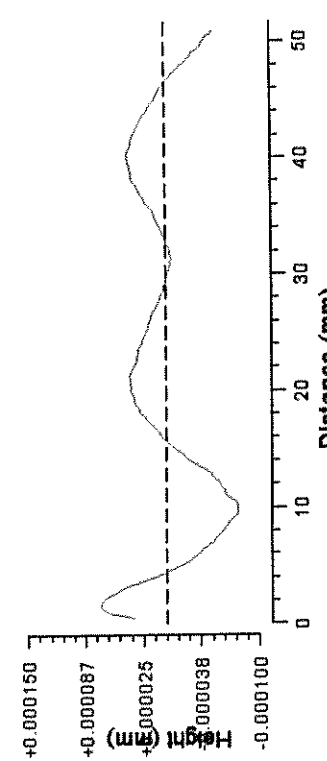
f115 L2

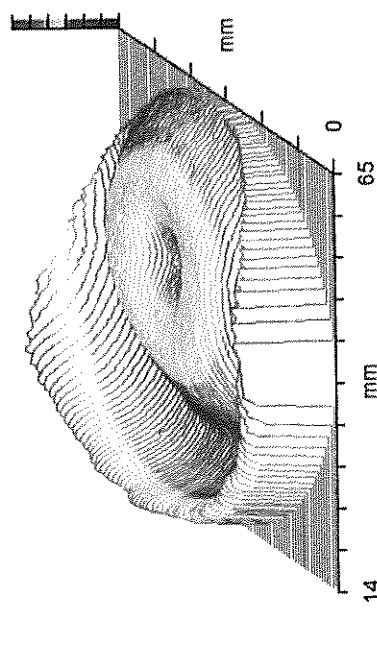
				INSPECTION DATA			
Customer PO#		P251841		WO#	1289-05	PN 4494	Date
Full Quantity		1		Quantity Tested	1	Material SF6	10482 Lot # 1
Parameter		Specifications		Parameter		Specifications	
N		NOM	TOL	N		NOM	TOL
1	Diameter or Length	41.862	+0.00 -0.100	11	Irreg. S1, Fr. or Wv.	16.65 nm rms	
2	Width			12	Surface Quality / SD S1	60-40	
3	Clear Aperture 1, mm	35.0		13	Radius S2, mm	82.575	+/- .700
4	Clear Aperture 2, mm	35.0		14	Power S2, Fr. or Wv.	-	-
5	SAG 1, mm			15	Irreg. S2, Fr. or Wv.	16.65 nm rms	
6	SAG 2, mm			16	Surface Quality / SD S2	60-40	
7	Center Thickness, mm	5.008	+/- .05	17	TIR, mm	20 microns	
8	Full Thickness, mm			18	Wedge, mm		
9	Radius S1, mm	55.905	+/- .130	19			
10	Power S1, Fr. or Wv.	-	-	20			
				ACTUAL (MEASURED)			
				Part Number			
N	1	2	3	4	5	6	
1	41.786						
2							
3							
4							
5							
6							
7	4.846						
8							
9	55.90						
10							
11							
12	< 60-40						
13	82.59						
14							
15							
16	< 60-40						
17	8 microns						
18							
19							
20							
				QC Inspector			

GPI Application  
Surface/Wavefront Map



Surface/Wavefront Profile





Oblique Plot

MEASURE

- Analyze
- Mask Data
- Save Data
- Load Data
- Calibrate
- Reset

Measure Cntr.

Analyze Cntr.

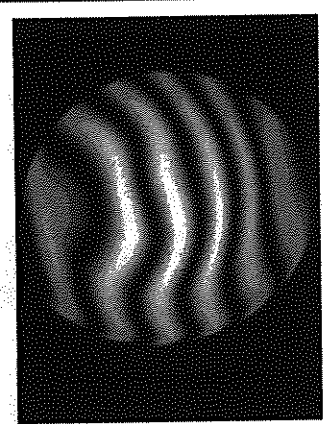
5/8 Profile

- Slope Mag
- Slope X
- Slope Y
- PGF
- MTF
- MTF Profile
- Zernikes
- ISO 10110-5
- SynthGringles

PV	0.309 wave
rms	0.064 wave
Power	-0.455 wave
Size X	50.7 mm
Size Y	54.9 mm

Removed: Pst Tlt Pwr	Trimmed: 1
Aperture OD (%):	Filter: Off

Intensity Map



Measurement Attributes

Thu Dec 09 18:27:13 1999	Data sign: Normal
P/N: 10482 B	Scale Factor: 0.5
PO#: F251841	Camera Res: 233.5 um
F/15 Imager, Lens 2, 55.90 ROC	

Analyze Attr

- Process
- Report
- Units

Video Monitor

*Roland - worst case measurement - aperture not on.  
Marianne*

Sm Aperture Z490 Oblique Plot

MEASURE  
Analyze  
Mask Data  
Save Data  
Load Data  
Calibrate  
Reset

Measure Cntr  
Analyze Cntr

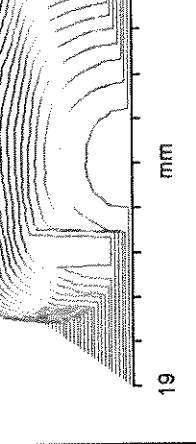
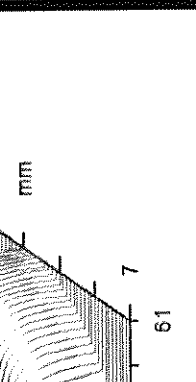
S/W Profile  
Slope Mag  
Slope X  
Slope Y

PSF  
MTF  
MTF Profile  
Zernikes

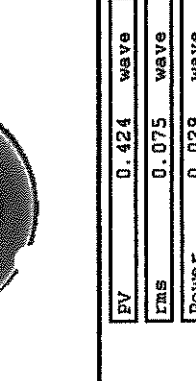
ISO 10110-5

SynthFringes

Analyze Attri  
Process  
Report  
Units  
Video Monitor

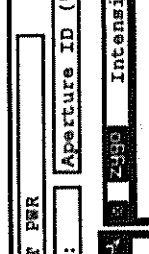


FV	0.424	wave
RMS	0.075	wave
Power	0.029	wave
Size X	41.6	mm
Size Y	41.6	mm



FV	0.289	wave
RMS	0.090	wave

Removed: BFT TLT PWR  
Aperture OD (%):  
Trimmed: 1  
Filter: Off



Measurement Attributes  
Data Sign: Normal  
Scale Factor: 0.5  
Camera Res: 233.5 um

Thu Dec 09 18:23:23 1999  
P/N: 10462 B  
PO#: P251841  
E/15 Imager, Lens 2, 82.59 ROC

13 mm view attached.  
aperture not on

**Zygo** GPI Application  
Surface/Wavefront Map

**Zygo** Oblique Plot

**Zygo** Surface/Wavefront Profile

**Zygo** Intensity Map

**Zygo** Measurement Attributes

**Zygo** Analyze Attr

**Zygo** Process

**Zygo** Report

**Zygo** Units

**Zygo** Video Monitor

Sm Aperture

MEASURE  
Analyze  
Mask Data  
Save Data  
Load Data  
Calibrate  
Reset

Measure Cntr  
Analyze Cntr

S/W Profile

Slope Mag  
Slope X  
Slope Y

PSE  
MTF  
MTF Profile  
Zernikes

ISO 10110-5

SynthFringes

Removed: PSF TLF PWR Trimmed: 1  
Aperture OD (\$): Aperture ID (\$): Filter: Off

FV 0.075 wave  
RMS 0.015 wave  
Power 0.105 wave  
Size X 12.9 mm  
Size Y 12.8 mm

FV 0.039 wave RMS 0.013 wave  
Data Sign: Normal  
Scale Factor: 0.5  
Camera Res: 233.5 um

PO#: P251841  
E/15 Imager, Lens 2, 82.59 ROC (13 mm Aperture)

Wavefront Map: +0.000017 mm, -0.000031 mm, 35 mm, 49 mm, 24 mm, 37 mm

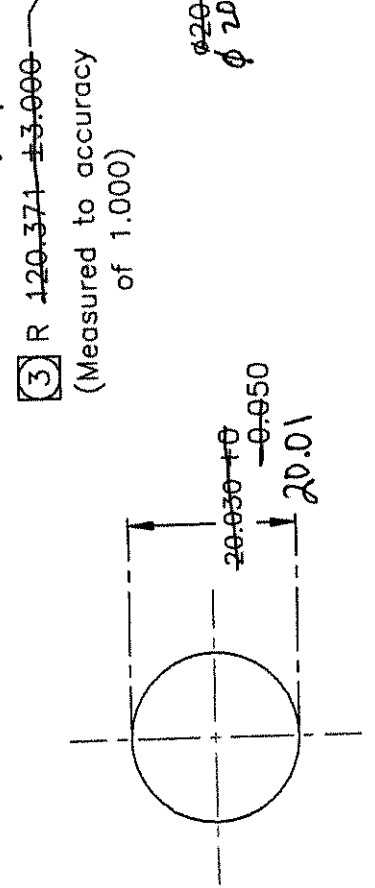
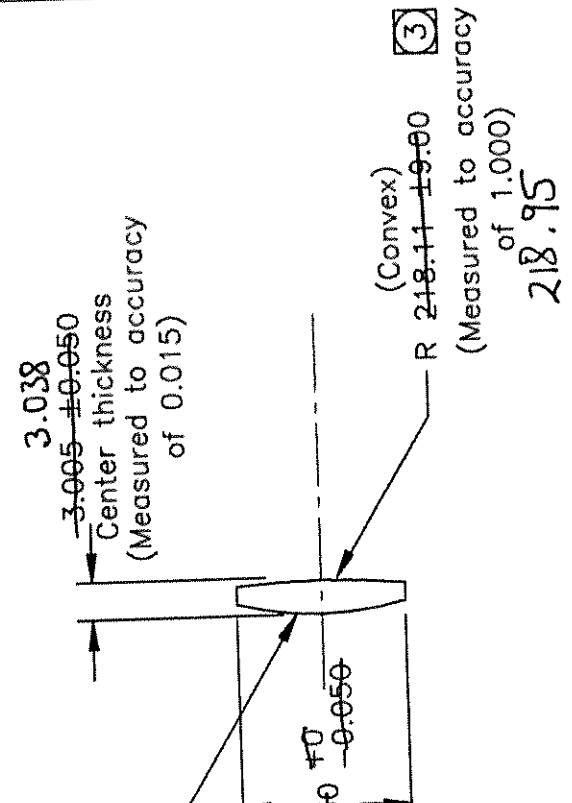
Wavefront Profile: +0.000020, +0.000005, 0.000010, -0.000025, -0.000040, Distance (mm) 0, 5, 10

Intensity Map: 2490

Measurement Attributes: Thu Dec 09 18:22:06 1999, P/N: 10482 B, PO#: P251841, E/15 Imager, Lens 2, 82.59 ROC (13 mm Aperture)

*Roland - This is a 13 mm measurement of the dip in the middle.*

REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION	9/9/99	R. Sarlot	
C	Decreased diameter			



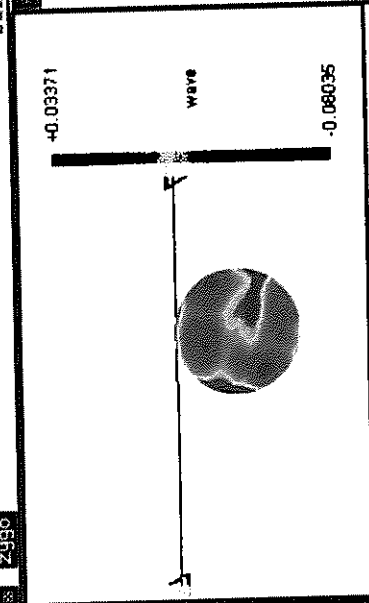
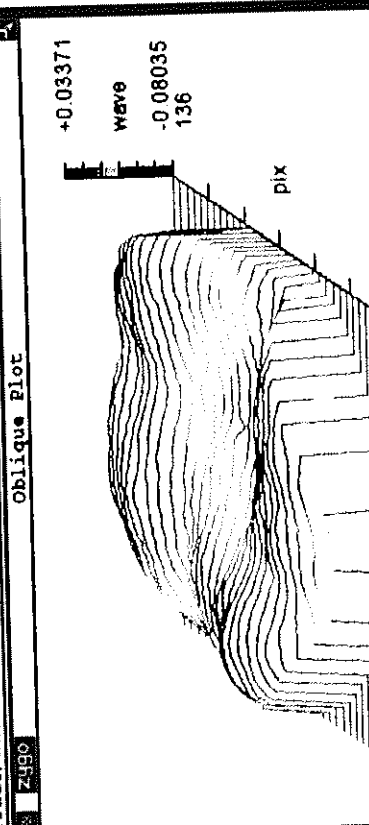
- NOTES:
- Dimensions are in millimeters
  - Material:
    - ✓ BaF2  $n(587.5618\text{nm})=1.474478 \pm 0.0005$
    - Grain boundary free
    - No visible inclusions
  - Optical Surfaces:
    - ✓ Scratch dig 60/40 per MIL-0-13830A
    - Micro roughness/finish <10A rms
    - ✓ Figure <0.065 degrees (TIR 25um) 0.043 (TIR 15um)
    - Wedge < 0.065 degrees
    - ✓ Pitch polish to edge
    - Chamfer all edges with 0.5mm face width max by 45 degrees
    - Clear aperture - 15.0 mm diameter
    - High transmission coating for 1.0um to 2.8um -Not yet specified
    - Must withstand 77K operating temperature
  - All surface dimensions are at standard Temp & Pressure
  - Inspection report based on final data.
  - Radial fit to vendor's test plates.

CONTACT: ROLAND SARLOT 520-625-7252  
 Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7859

DESIGNED BY: R. SARLOT	DATE: 05/08/98	PROJECT: ARIES
DRAWN BY: R. SARLOT	CHECKED BY: D. McCarthy	TITLE: F/30 IMAGER LENS #1
APPROVED: D. McCarthy	DATE: 03/19/99	REVISION: C
APPROVED:	DATE: 7/27/99	DESIGN NUMBER: 10483
APPROVED:	DATE:	PLAST SIZE SCALE: None
JOB NO.:	ACTIVITY CODE:	FILE ABOVE LOCATION: A
UNLESS OTHERWISE SPECIFIED: TOLERANCES ON: DIMENSIONS ARE IN: MATERIAL: FINISH:		

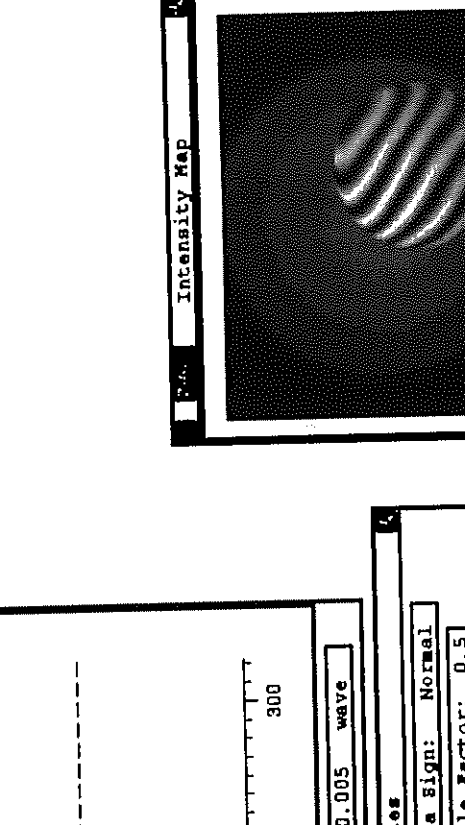
f/30 L1

				INSPECTION DATA		
Customer PO# P251841				WO# 1289-06	PN 4495	Date
Full Quantity 1		Quantity Tested 1		Material BaF2	1048.3	Lot # 1
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	20.030	+1.00 -1.050	11	Irreg. S1, Fr. or Wv.	16.65 nm rms
2	Width			12	Surface Quality / SD S1	60-40
3	Clear Aperture 1, mm	15.0		13	Radius S2, mm	218.11 +/- 9.00
4	Clear Aperture 2, mm	15.0		14	Power S2, Fr. or Wv.	—
5	SAG 1, mm			15	Irreg. S2, Fr. or Wv.	16.65 nm rms
6	SAG 2, mm			16	Surface Quality / SD S2	60-40
7	Center Thickness, mm	3.005	+/- .05	17	TIR, mm	25 microns
8	Full Thickness, mm			18	Wedge, mm	
9	Radius S1, mm	120.371	+/- 3.000	19		
10	Power S1, Fr. or Wv.	—	—	20		
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	20.01					
2						
3						
4						
5						
6						
7	3.038					
8						
9	120.57					
10						
11	.018 W rms					
12	< 60-40					
13	218.95					
14						
15						
16	< 60-40					
17	15 microns					
18						
19						
20						
				QC Inspector		



Removed: PST TLT FWR  Trimmed:  0  
 Aperture OD (%): 75 Aperture ID (%): 0 Filter: Off

FV	0.114	wave
IRMS	0.018	wave
Power	0.048	wave
Size X		CM
Size Y		CM



Measurement Attributes

Date	Tue Nov 09 12:43:35 1999
Data Sign	Normal
S/N	10483 C
Scale Factor	0.5
PO#	P251841
Camera Res	um
Image Lens	F/30 Imager Lens 1, ROC 120.371

- MEASURE
- Analyze
- Mask Data
- Save Data
- Load Data
- Calibrate
- Reset
- Measure Cntr
- Analyze Cntr
- S/W Profile
- Slope Mag
- Slope X
- Slope Y
- PSF
- MTE
- MTF Profile
- Kernikes
- ISO 10110-5
- SynthFringes
- Analyze Attr
- Process
- Report
- Units
- Video Monitor

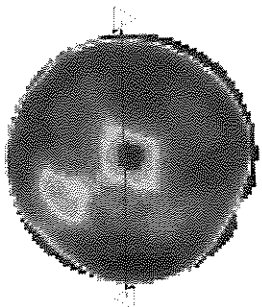


GPI Application

Surface/Wavefront Map

8m Aperture

Zygo



PV 0.160 wave  
RMS 0.022 wave  
Power 0.072 wave  
Size X mm  
Size Y mm

Measure Cntr  
Analyze Cntr

S/W Profile  
Slope Mag  
Slope X  
Slope Y

PSE  
MTE  
MTE Profile  
Zernikes  
ISO 10110-5

SynchFringes

Analyze Attr

Process

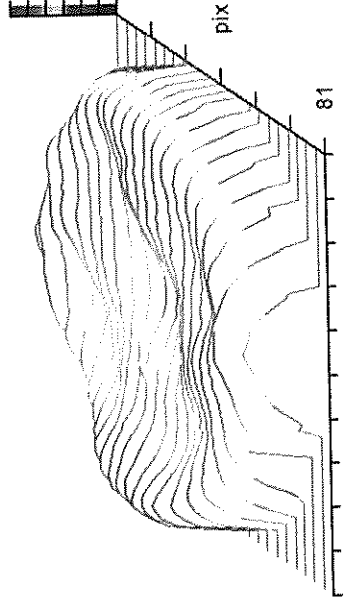
Report

Units

Video Monitor

Oblique Plot

Zygo

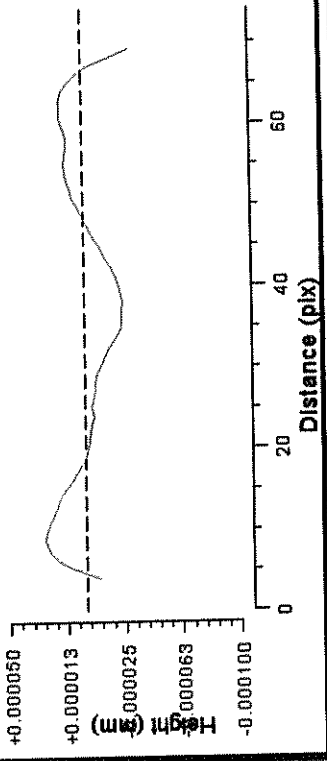


Trimmed: 1  
Filter: Off

Removed: PST TLT PWR  
Aperture OD (%):  
Aperture ID (%):

Surface/Wavefront Profile

Zygo



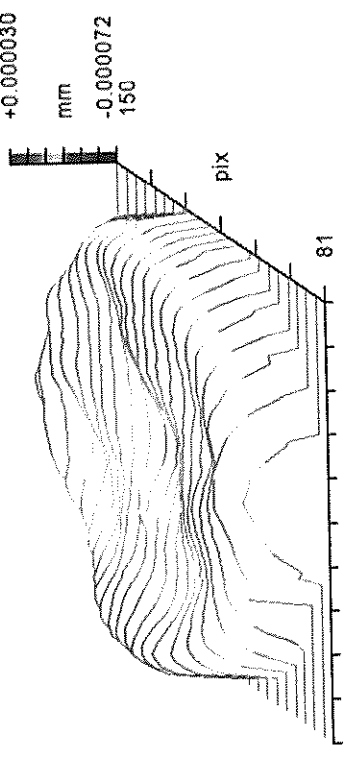
PV 0.090 wave rms 0.023 wave

Measurement Attributes

Red Dec 08 18:58:19 1999  
Data Sign: Normal  
B/N: 10483 C  
Scale Factor: 0.5  
PO#: P251841  
Camera Res: um  
P/30 Imager Lens 1, Baf2, 218.110 ROC

Surface/Wavefront Map

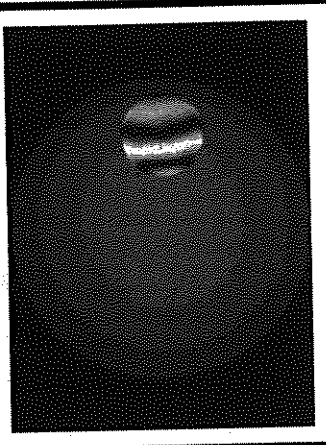
Zygo



Removed: PST TLT PWR  
Aperture OD (%):  
Aperture ID (%):

Intensity Map

Zygo



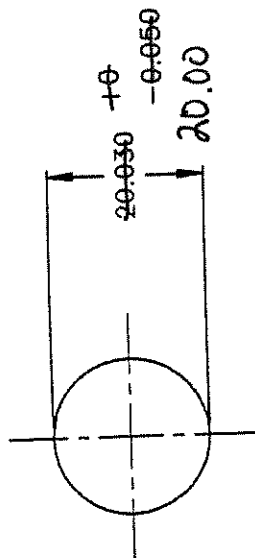
*Round Worst case measurement - aperture not on Maxima*

REVISIONS		
LTR	DESCRIPTION	DATE

Not in spec

3.132  
~~3.205 ± 0.050~~  
 Center thickness  
 (Measured to accuracy  
 of 0.015)

3  
~~R 419.228 ± 1.685~~  
 (Measured to accuracy  
 of 1.000)  
 119.41



NOTES:

- 1) Dimensions are in millimeters
- 2) Material: ✓ Schott SF6 n(587.5618nm)=1.805180 ± 0.0005  
Grade 2, B1, "Normal quality" stripe
- 3) Optical Surfaces: ✓ Scratch dig 60/40 per MIL-0-13830A  
Micro roughness/finish <10A rms  
✓ Figure <16.65nm rms  
✓ Wedge < 0.050 degrees (TIR 19um) 0.025° (TIR 8um)
- 5) Pitch polish to edge
- 6) Chamfer all edges with 0.5mm face width max by 45 degrees
- 7) Clear aperture - 16.0 mm
- 8) High transmission coating for 1.0um to 2.8um - Not yet specified  
Must withstand 77K operating temperature
- 9) All surface dimensions are at standard Temp & Pressure
- 10) Inspection report based on final data.
- 11) Radii fit to vendor's test plates.

CONTACT: ROLAND SARLOT 520-626-7252  
 Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)821-7659

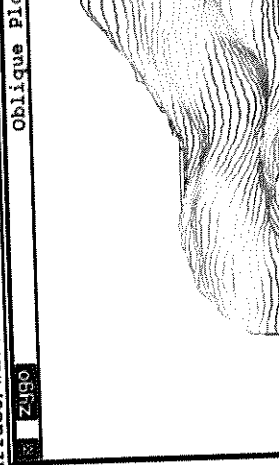
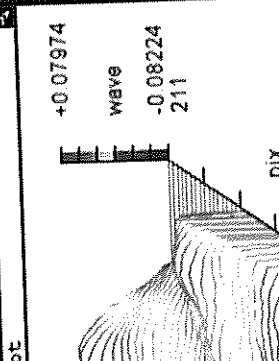
DESIGNED BY: R. SARLOT	DATE: 05/18/98	CATEGORY: ARIES
DRAWN BY: R. SARLOT	03/19/99	PROJECT: ARIES
CHECKED BY: D. McCarthy	7/27/99	TITLE: F/30 IMAGER LENS #2
APPROVER:		PLOT SIZE SCALE: None
APPROVER:		DRAWING NUMBER: 10484
APPROVER:		REVISION: B
JOB NO.:		
ACTIVITY CODE:		
CURRENT TIME/DATE/FILE LOCATION:		
FILE ARCHIVE LOCATION:		

FINISH

2

f/30 L2

				INSPECTION DATA		
Customer PO# <b>P251841</b>				WO# <b>1289-07</b>	PN <b>4496</b>	Date
Full Quantity <b>1</b>		Quantity Tested <b>1</b>		Material <b>SF6</b>	<b>10484</b>	Lot # <b>1</b>
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	<b>20.030</b>	<b>±.05</b>	11	Irreg. S1, Fr. or Wv.	<b>16.65 nm rms</b>
2	Width			12	Surface Quality / SD S1	<b>60/40</b>
3	Clear Aperture 1, mm			13	Radius S2, mm	<b>81.610 H-.800</b>
4	Clear Aperture 2, mm			14	Power S2, Fr. or Wv.	
5	SAG 1, mm			15	Irreg. S2, Fr. or Wv.	<b>16.65 nm rms</b>
6	SAG 2, mm			16	Surface Quality / SD S2	<b>60/40</b>
7	Center Thickness, mm	<b>3.205</b>	<b>H-.050</b>	17	TIR, mm	<b>19 microns</b>
8	Full Thickness, mm			18	Wedge, mm	
9	Radius S1, mm	<b>119.228</b>	<b>H-1.685</b>	19		
10	Power S1, Fr. or Wv.			20		
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	<b>20.00</b>					
2						
3						
4						
5						
6						
7	<b>3.132</b>					
8						
9	<b>119.41</b>					
10						
11						
12	<b>&lt;60/40</b>					
13	<b>81.55</b>					
14						
15						
16	<b>&lt;60/40</b>					
17	<b>8 microns</b>					
18						
19						
20						
				QC Inspector		

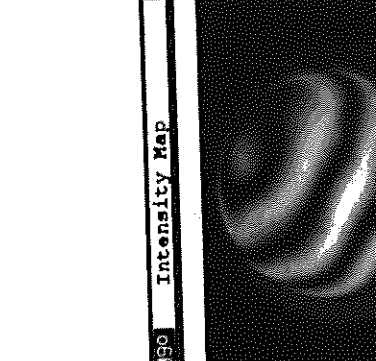


8m Aperture  
 MEASURE  
 Analyze  
 Mask Data  
 Save Data  
 Load Data  
 Calibrate  
 Reset  
 Measure Cntr  
 Analyze Cntr

Removed: PST TLT PWR  
 Aperture OD (%): 80  
 Aperture ID (%): 0  
 Filter: Off  
 Trimmed: 0

PV 0.162 wave  
 RMS 0.029 wave  
 Power -0.150 wave  
 Size X cm  
 Size Y cm

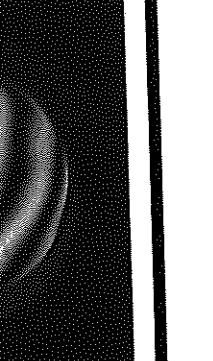
S/W Profile  
 Slope Mag  
 Slope X  
 Slope Y  
 PSF  
 MTF  
 MTF Profile  
 Zernikes  
 ISO 10110-5  
 SynthFringes



PV 0.091 wave  
 RMS 0.028 wave

z490  
 Surface/Wavefront Profile  
 Height (wave)  
 Distance (pix)

Analyze Attr  
 Process  
 Report  
 Units  
 Video Monitor

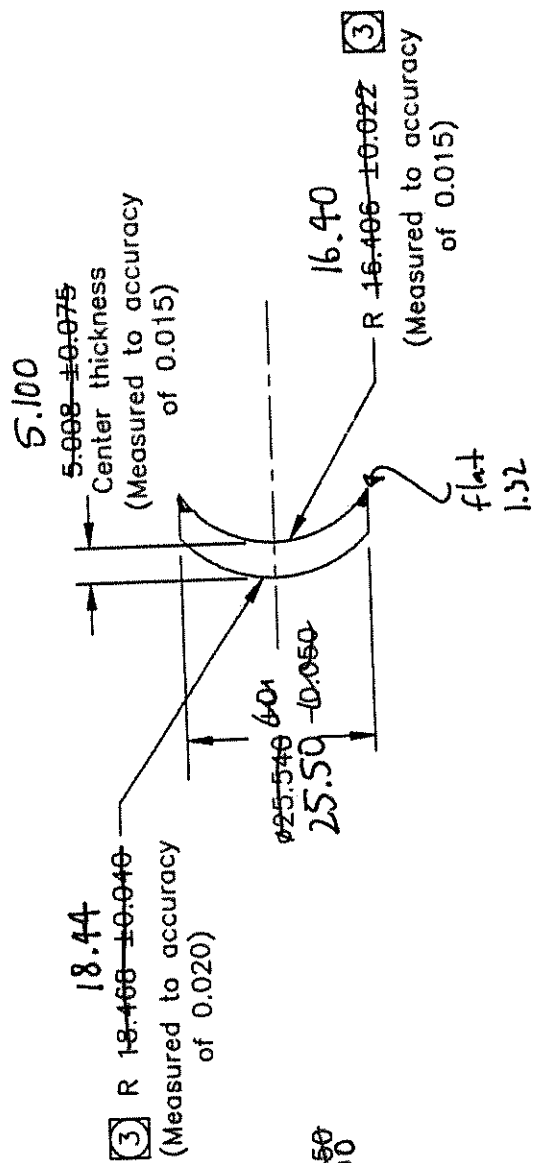


z490  
 Intensity Map

Measurement Attributes  
 Data Sign: Normal  
 Scale Factor: 0.5  
 Camera Res: um  
 P/N: 10484 B  
 PO#: P251841  
 P/30 Imager Lens 2, Schott SF6, ROC 81.6



REVISIONS		DATE	REVISED BY	APPROVED
LTR	DESCRIPTION			



Steward Observatory, University of Arizona  
 933 N. Cherry Avenue, Tucson, AZ 85721 (520)621-7659

DESIGNED BY: R. SARLOT	DATE: 05/08/88	PROJECT: ARIES
CHECKED BY: D. McCarthy	DATE: 03/19/89	TITLE: F/30 IMAGER LENS #3
APPROVED:	DATE: 7/27/89	SCALE: None
APPROVED:	ACTIVITY CODE: A	DRAWING NUMBER: 10485
APPROVED:	JOB NO.:	REVISION: B
CURRENT TIME/DATE/FILE LOCATION: FILE ARCHIVE LOCATION:		

UNLESS OTHERWISE SPECIFIED	DECIMALS	ANGLES
TOLERANCES ON:		
XXX XX AS NOTED		
DIMENSIONS ARE IN ENGLISH METRIC X		
MATERIAL		
FINISH		

NOTES:

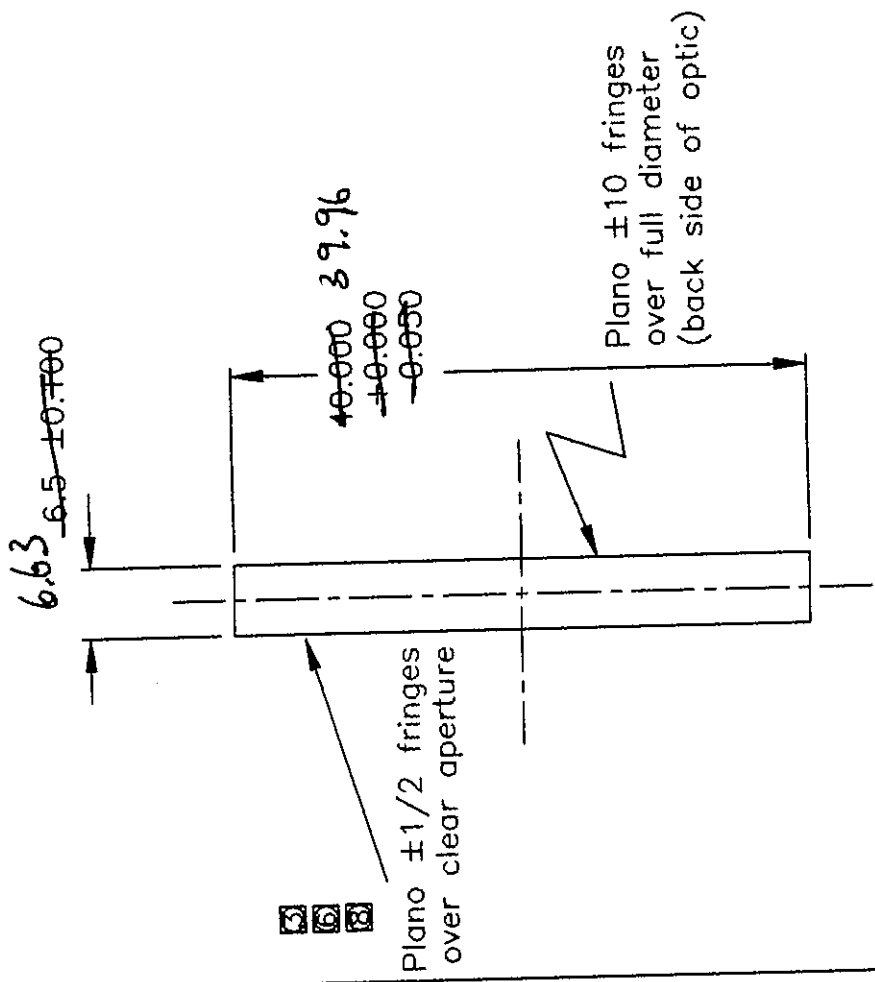
- 1) Dimensions are in millimeters
- 2) Material:  $\checkmark$  BaF<sub>2</sub>  $n(587.5618\text{nm})=1.474478 \pm 0.0005$   
 Grain boundary free  
 No visible inclusions
- 3) Optical Surfaces:  
 $\checkmark$  Scratch dig 60/40 per MIL-0-13630A  
 Micro roughness/finish <10A rms  
 $\circ$  Figure <16.65nm rms  
 Wedge < 0.04487 degrees (TIR 20um)  $0.036^\circ$  (TIR 15um)  
 Pitch polish to edge  
 Chamfer all edges with 0.5mm face width max by 45 degrees  
 Clear aperture - 22.0 mm diameter  
 High transmission coating for 1.0um to 2.8um - Not yet specified  
 Must withstand 77K operating temperature  
 All surface dimensions are at standard Temp & Pressure  
 Inspection report based on final data.  
 Radii fit to vendor's test plates.

- 4/30 L3

				INSPECTION DATA		
Customer PO# P251841				WO# 1289-08	PN 4497	Date
Full Quantity 1		Quantity Tested 1		Material B <sub>2</sub> F <sub>2</sub>	10485	Lot # 1
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	25.540	+1.00 -0.05	11	Irreg. S1, Fr. or Wv.	16.65 mm rms
2	Width			12	Surface Quality / SD S1	60-40
3	Clear Aperture 1, mm			13	Radius S2, mm	16.406 +/-0.022
4	Clear Aperture 2, mm			14	Power S2, Fr. or Wv.	-
5	SAG 1, mm			15	Irreg. S2, Fr. or Wv.	16.65 mm rms
6	SAG 2, mm			16	Surface Quality / SD S2	60-40
7	Center Thickness, mm	5.008	+/-0.075	17	TIR, mm	20 microns
8	Full Thickness, mm			18	Wedge, mm	
9	Radius S1, mm	18.468	+/-0.04	19	Flat	1.25 mm ref.
10	Power S1, Fr. or Wv.	-	-	20	ID	23.04 ref.
				21	ID (S)	Concentricity
				ACTUAL (MEASURED):		
				Part Number		
N	1	2	3	4	5	6
1	25.500					
2						
3						
4						
5						
6						
7	5.100					
8						
9	18.44					
10						
11						
12	60-40					
13	16.40					
14						
15						
16	60-40					
17	16 microns					
18						
19	1.32 mm					
20	22.87 mm					
21	13 microns					
				QC Inspector		

before  
aperture  
side  
over built

REVISED BY	DATE	DESCRIPTION
LTR		



- NOTES:
- 1) Dimensions are in millimeters
  - 2) Polished to full diameter
  - 3) Optical Surface:  
< 16.65nm rms figure
  - 4) Wedge < 10A rms micro roughness/finish
  - 5) Clear aperture - 35.0 mm diameter
  - 6) Pure gold coating for 1-2.5um high reflectivity
  - 7) Bevel all edges with 0.5mm face width max by 45 degrees
  - 8) Scratch and dig spec: 60/40 per mil-0-13830A
  - 9) All surface dimensions are at standard temperature and pressure
  - 10) Request inspection report based on final data

As delivered -

CONTACT: ROLAND SARLOT 520-626-7252  
Steward Observatory, University of Arizona  
933 N. Cherry Avenue, Tucson, AZ 85721 (520)821-7859

DESIGNED BY	DATE	PROJECT	TITLE
R. SARLOT	08/08/98	ARIES-Az. Infrared Echelle Spectro.	Slit Plane Mirror
DRWING BY	03/19/99		Redirection to Refractive Cameras
CHECKED BY			
APPROVED			
APPROVED			
APPROVED			
JOB NO.	ACTIVITY CODE	GROUP NUMBER	NUMBER
		10488	A

UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN  
ENGLISH UNITS  
MATERIAL  
Fused Silica  
FINISH



# MIRROR

				INSPECTION DATA		
Customer PO# <i>P251841</i>				WO# <i>1300-04</i>	PN <i>4509</i>	Date
Full Quantity <i>1</i>		Quantity Tested <i>1</i>		Material <i>Fused Silica</i>	<i>10488A</i>	Lot # <i>1</i>
Parameter		Specifications		Parameter		Specifications
N		NOM	TOL	N	NOM	TOL
1	Diameter or Length	<i>40.00</i>	<i>+0.000</i> <i>-0.050</i>	11	Irreg. S1, Fr. or Wv.	<i>.0265 λ rms c. 632.8</i>
2	Width	<i>—</i>		12	Surface Quality / SD S1	<i>60/40</i>
3	Clear Aperture 1, mm	<i>35.00</i>		13	Radius S2, mm	<i>∞</i>
4	Clear Aperture 2, mm	<i>35.00</i>		14	Power S2, Fr. or Wv.	<i>10 Fr.</i>
5	SAG 1, mm	<i>∞</i>		15	Irreg. S2, Fr. or Wv.	<i>10 Fr.</i>
6	SAG 2, mm	<i>∞</i>		16	Surface Quality / SD S2	<i>60/40</i>
7	Center Thickness, mm	<i>6.50</i>	<i>±0.100</i>	17	TIR, mm	<i>50 microns</i>
8	Full Thickness, mm	<i>—</i>		18	Wedge, mm	<i>—</i>
9	Radius S1, mm	<i>∞</i>		19		
10	Power S1, Fr. or Wv.	<i>.5 Fr.</i>		20		
				ACTUAL (MEASURED)		
				Part Number		
N	1	2	3	4	5	6
1	<i>39.96</i>					
2	<i>—</i>					
3	<i>—</i>					
4	<i>—</i>					
5	<i>—</i>					
6	<i>—</i>					
7	<i>6.63</i>					
8	<i>—</i>					
9	<i>—</i>					
10	<i>.112 λ P-V</i>	<i>see interferogram</i>				
11	<i>.020 λ rms</i>	<i>"</i>	<i>"</i>			
12	<i>&lt; 60/40</i>					
13	<i>—</i>					
14	<i>.445 λ P-V</i>	<i>see interferogram</i>				
15	<i>.445 λ P-V</i>	<i>"</i>	<i>"</i>			
16	<i>&lt; 60/40</i>					
17	<i>27 microns</i>					
18	<i>—</i>					
19						
20						
				QC Inspector		

**GPI Application**  
Surface/Wavefront Map

8m Aperture Z990

**MEASURE**  
Analyze  
Mask Data  
Save Data  
Load Data  
Calibrate  
Reset

Measure Cntr  
Analyze Cntr

S/M Profile  
Slope Mag  
Slope X  
Slope Y

PSF  
MTF  
MTF Profile  
Zernikes

ISO 10110-5  
SynthFringes

Analyze Attr  
Process  
Report  
Units  
Video Monitor

Oblique Plot

Removed: PST TLT  
Aperture ID (\$):  
Aperture OD (\$):  
Trimmed: 0  
Filter: Off

Surface/Wavefront Profile

PV 0.112 wave  
rms 0.020 wave  
Power 0.042 wave  
Size X 3.5 cm  
Size Y 3.5 cm

PV 0.080 wave  
rms 0.019 wave

Intensity Map

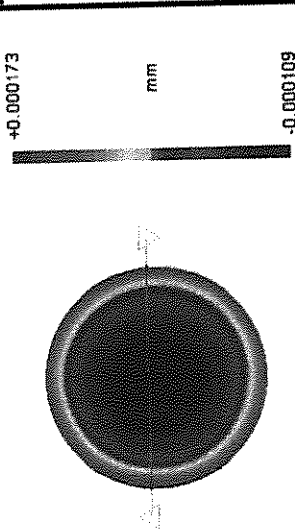
Measurement Attributes  
Data sign: Normal  
Scale Factor: 0.5  
Camera Res: 230.9 um  
PO#: P251841  
Slit Plane Mirror Redirection to Refract

Wave: +0.06601  
Wave: -0.04625  
Wave: 50571

Roland - Arrow "A" points toward this surface.

GPL Application  
Surface/Wavefront Map

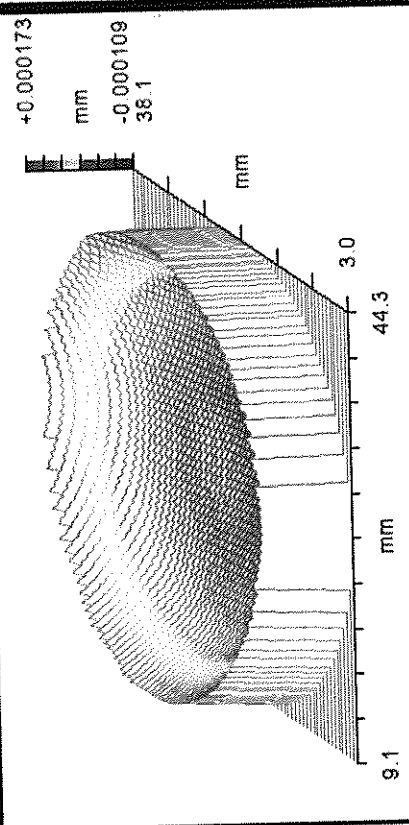
**8m Aperture** Z490



+0.000173 mm  
-0.000109

PV	0.445 wave
RMS	0.112 wave
Power	0.379 wave
Size X	34.8 mm
Size Y	34.8 mm

**Oblique Plot** Z490



+0.000173 mm  
-0.000109

**Measure Cntr**

Analyze Cntr

Removed: PST TIT

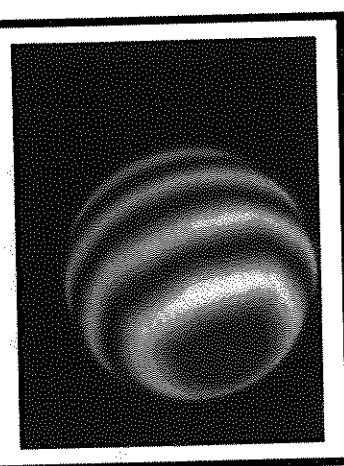
Aperture ID (%):

Aperture OD (%):

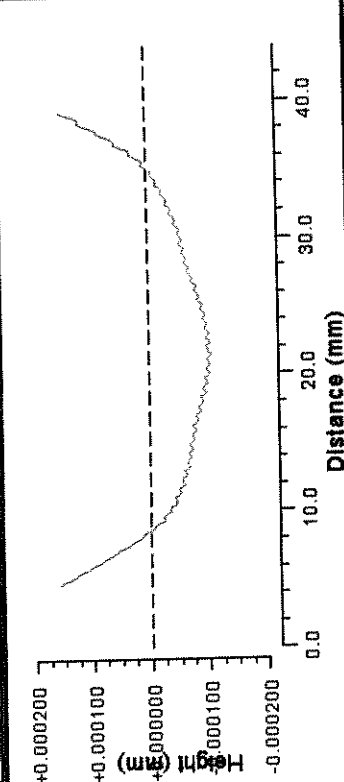
Trimmed: 1

Filter: Off

**Z490 Intensity Map**



**Surface/Wavefront Profile** Z490



Distance (mm)

PV	0.422 wave	RMS	0.168 wave
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**Measurement Attributes** Z490

Tue Jan 04 14:05:38 2000

P/N: 10488 A

PO#: P251841

Camera Res: 198.6 um

Slit plane Mirror, "back side of optic"

**8/W Profile**

Slope Mag

Slope X

Slope Y

DSP

MTF

MTF Profile

Zernikes

ISO 10110-5

**SynHfringes**

Analyze Attr

Process

Report

Units

Video Monitor