

California Institute of Technology  
Purchase Order 39-S657226

Nu-Tek Work Order 14236  
Final Data Summary  
HISPEC FEI Collimating OAP

Nu-Tek Precision Optical Corporation

December 16, 2024



*Nu-Tek's Quality Management System has been certified to  
ISO9001:2015.*

# Data Summary, HISPEC-0010-P0300



Parameter	Spec	SN1	SN3	SN4
Material: Zerodur <sup>†</sup>	—	Pass	Pass	Pass
Outer Diameter, mm	25.3 – 25.4	25.362	25.387	25.380
Radius of Curvature, mm	349.65 – 350.35	349.974	349.974	349.974
Off-Axis distance, mm	55.975 – 56.025	56 ± 0.025	56 ± 0.025	56 ± 0.025
Part Center Thickness, mm	8.88 – 9.08	9.040	9.040	9.040
Surface Figure Error, nm RMS	≤ 16	7.12	6.80	6.92
Surface Roughness, nm RMS	≤ 2	0.99	0.87	0.82
Scratch / Dig	≤ 60/40	Pass	Pass	Pass
Minimum Reflectivity from 0.97-2.55um, %	≤ 96	Pass	Pass	Pass
Average reflectivity from 0.97-2.55um, %	≤ 97.5	Pass	Pass	Pass

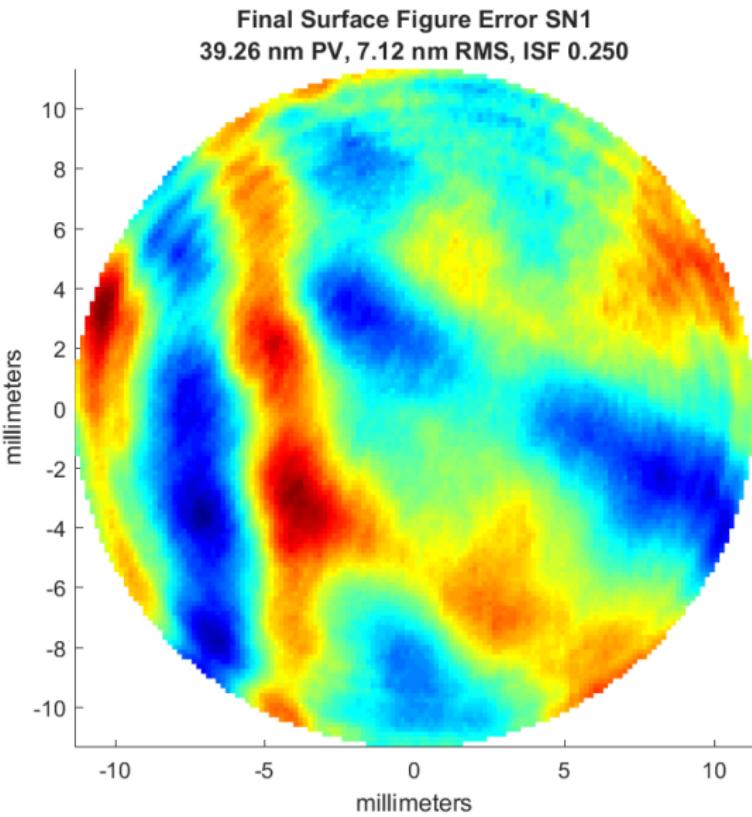
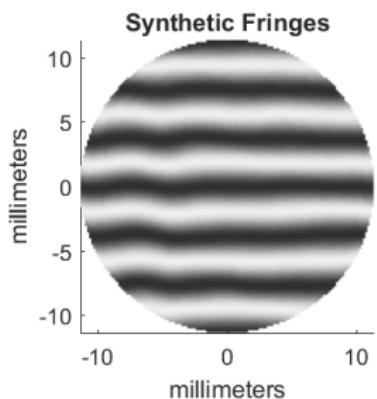
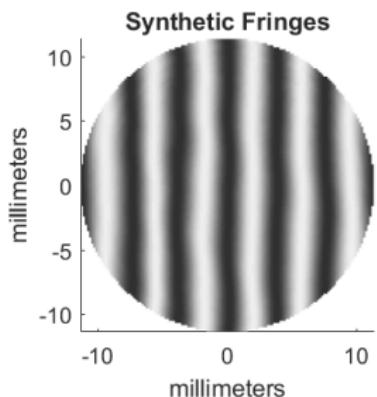
Notch was replaced with sandblasted scribe per quoted exception. Scribe does not meet positional requirements, accepted via email by Mitsuko Roberts 12/4/2024.

<sup>†</sup>Zerodur substrate material is used in place of Fused Silica, per quoted exception.

# Surface Figure SN1



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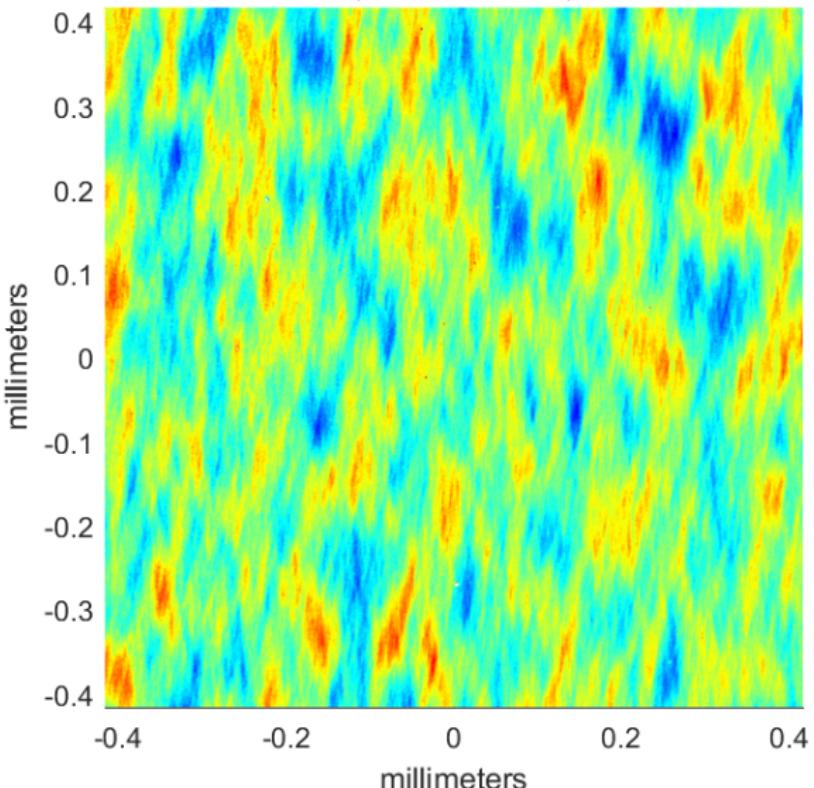


# Surface Roughness SN1



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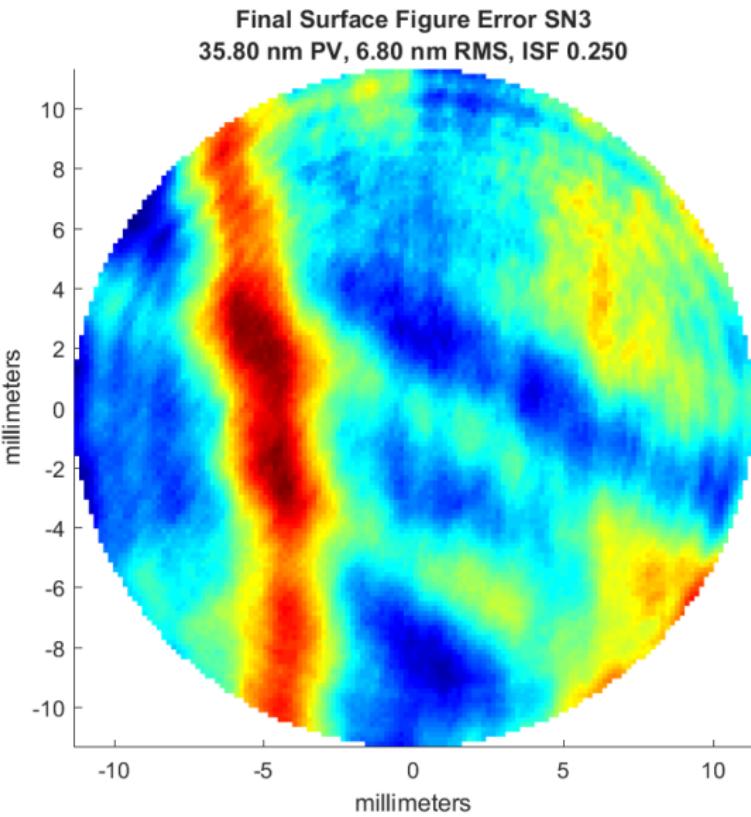
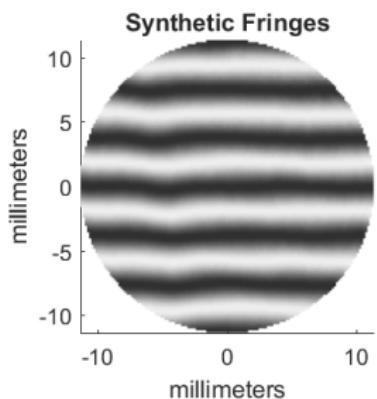
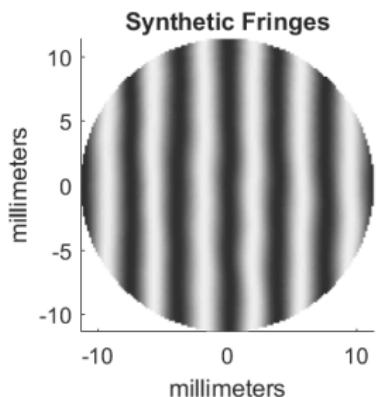
CA Annulus Roughness Sample 1  
9.60 nm PV, 0.99 nm RMS, ISF 0.500



# Surface Figure SN3



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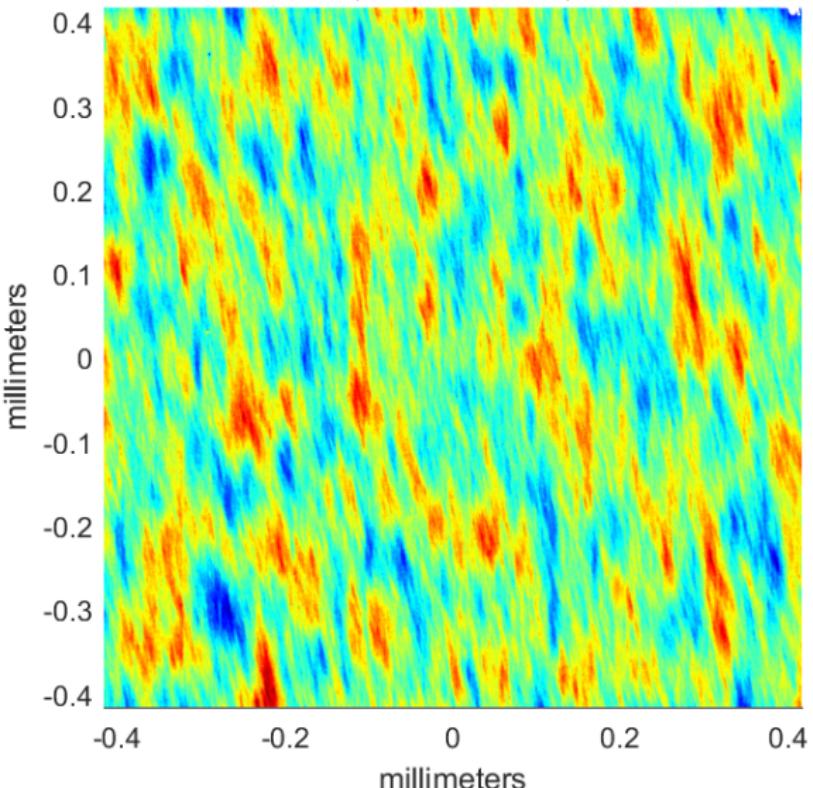


# Surface Roughness SN3



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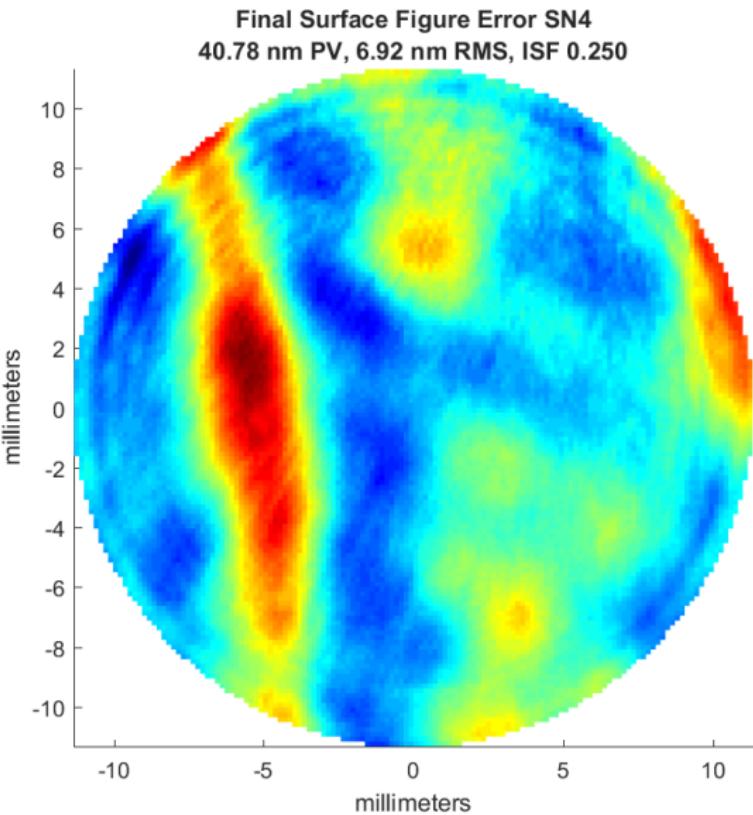
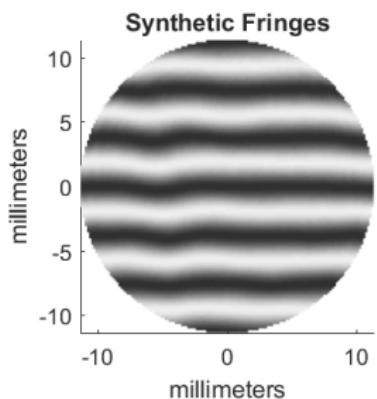
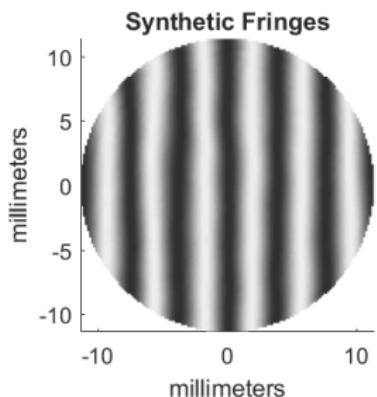
CA Annulus Roughness Sample 3  
7.23 nm PV, 0.87 nm RMS, ISF 0.500



# Surface Figure SN4



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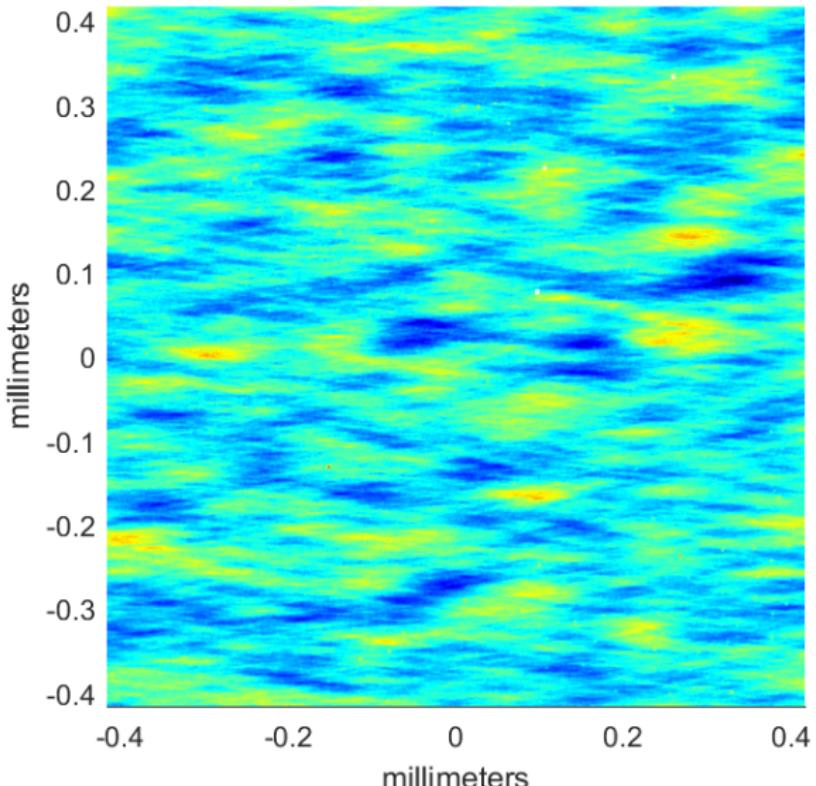


# Surface Roughness SN4

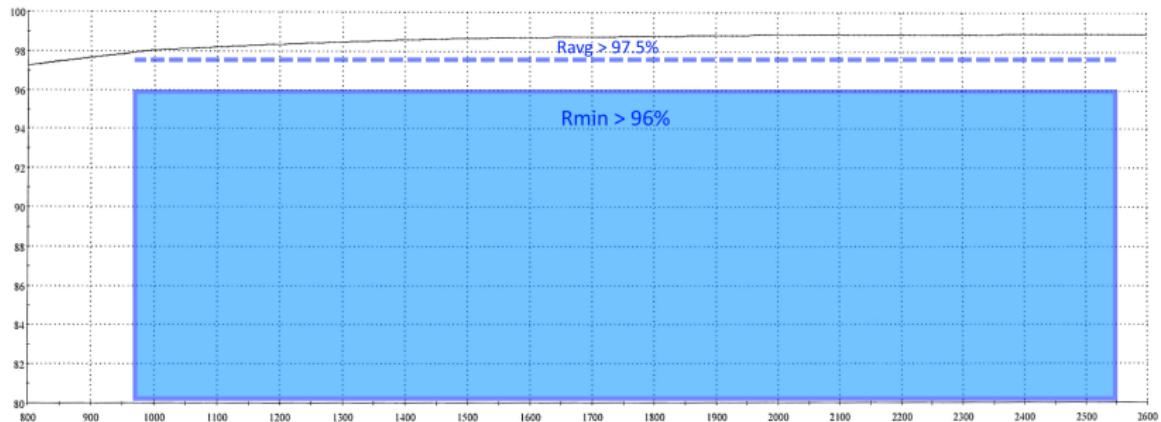


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CA Annulus Roughness Sample 4  
9.49 nm PV, 0.82 nm RMS, ISF 0.500



# Coating Reflectivity



# Certificate of Compliance



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<b>Customer</b>	Cal Tech	<b>Packing List</b>	17813
<b>Contract Number</b>	39-S657226	<b>Ship Date</b>	12/16/2024
<b>Part Number</b>	HISPEC-0010-P0300A	<b>SNs</b>	1, 3, 4
<b>Description</b>	HISPEC FEI Collimating OAP	<b>Quantity</b>	3
<b>Nu-Tek Order</b>	14236	<b>Cert Date</b>	12/16/2024

## Compliance Representation:

The undersigned certifies that all items shipped against the above Purchase Order are in conformance with the requirements, specifications, and drawings applicable to that order at the time of shipment.

Signed  
By  
Title

\_\_\_\_\_  
Robert Bupp  
Quality Representative

Date 12/16/2024