Schneider Kreuznach PYRITE 4.0-60 C-LF-SD with EL-16-40-TC-VIS-5D

shaping the future of optics

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Summary

- Almost Nyquist limited performance along the WD range (very good also on corner and edges)

- Good correlation with the MTFs on the datasheet

- Visible coma in Horizontal optical axis at F/4, better at F/5.6

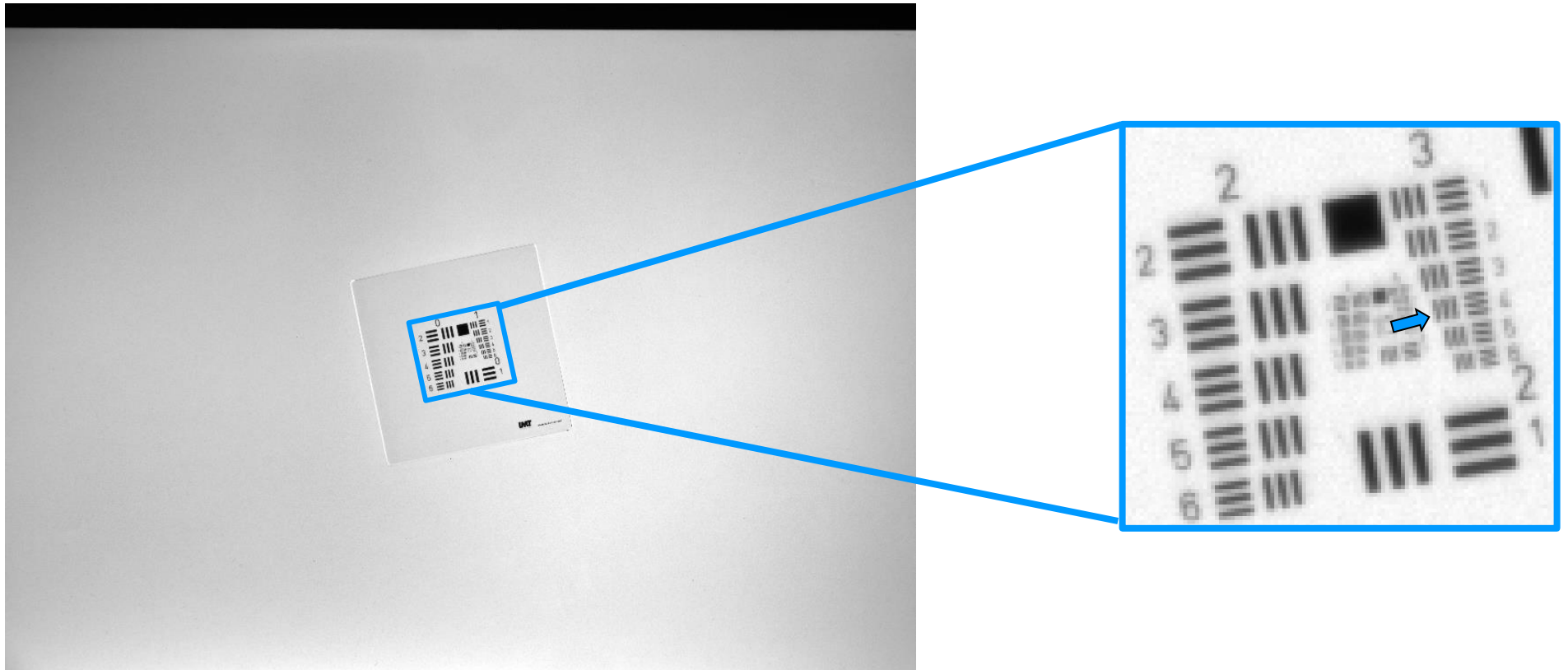- Decent performances in Horizontal optical axis overall

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Test setup

Camera: 1.1" (IDS UI-3200SE-M)
4104x3006 pixels, 3.45 um px

Lens: PYRITE 4.0-60 C-LF-SD
with EL-16-40-TC-VIS-5D embedded

F/#   4-32

Driver: Optotune Lens Driver 4

Target: Transparent USAF target

Light: White backlight

Optical axis: Vertical

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Method for image evaluation

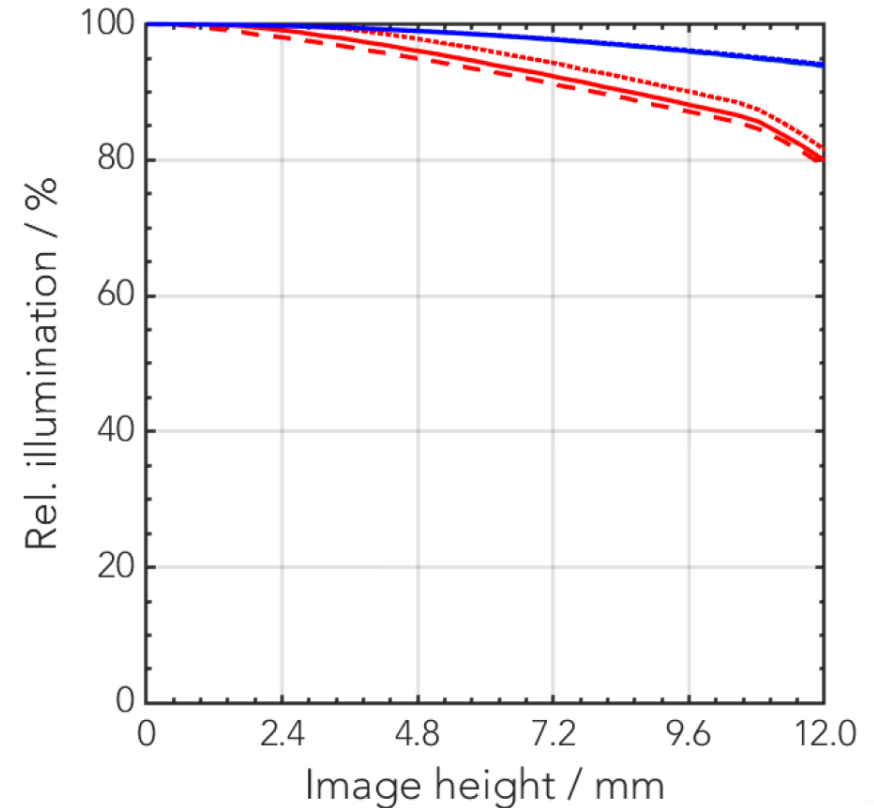➢ After acquisition, images are zoomed in to show resolution limited element

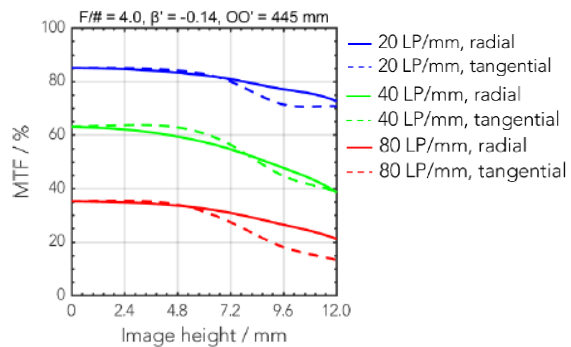# Relative illumination plots (β = magnification)

0 dpt, 480 mm WD F#/4

Camera

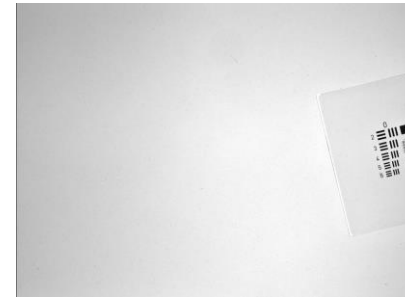Sensor size = 4104x3006 pixels

Nyquist limit = 144 lp/mm

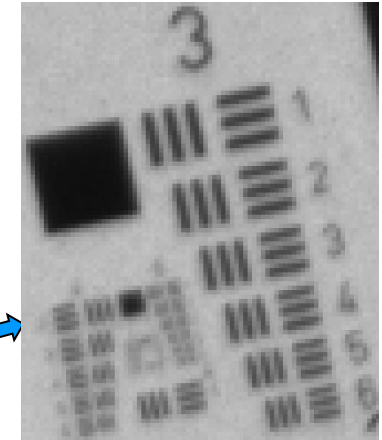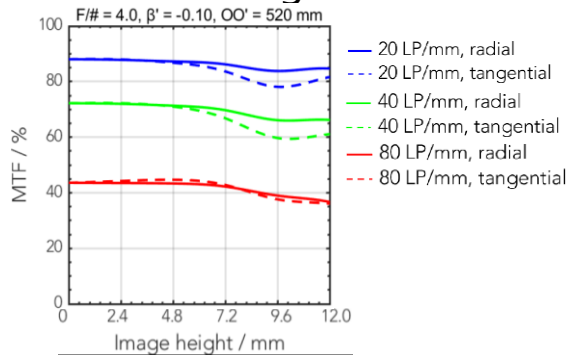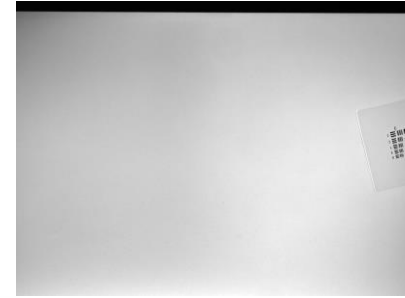Pixel size = 3.45 um

Light

White background illumination

	Center	Edge	Corner
USAF element:	4/2	4/2	4/2
Line width (um):	27.84	27.84	27.84
Lp/mm (object):	18	18	18
Magnification:	0.137	0.137	0.137
Lp/mm (image):	**131**	**131**	**131**

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-2.86 dpt, 900 mm WD F#/4

Camera

Sensor size = 4104x3006 pixels

Nyquist limit = 144 lp/mm

Pixel size = 3.45 um

Light

White background illumination
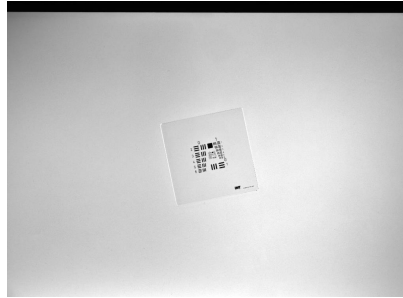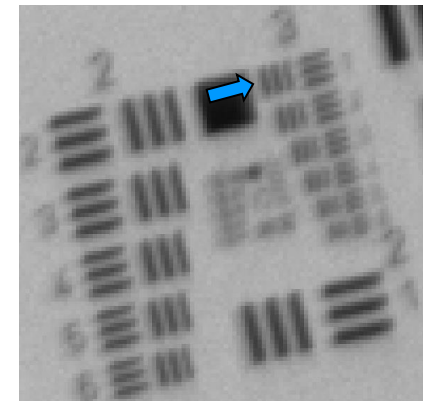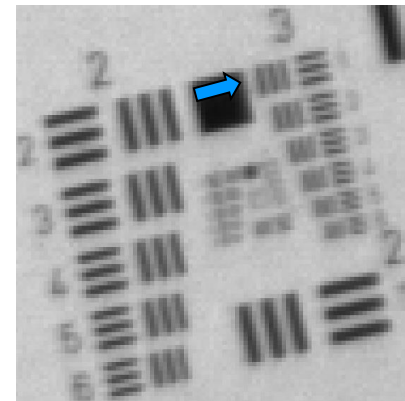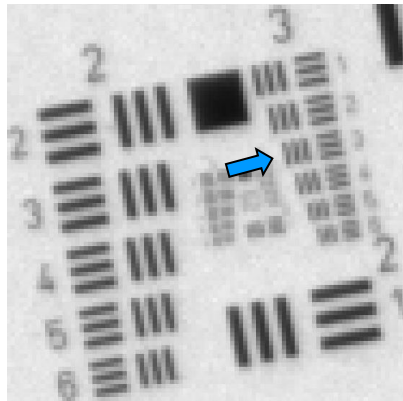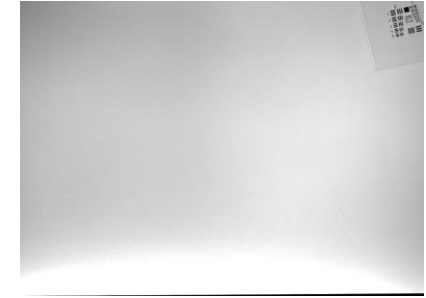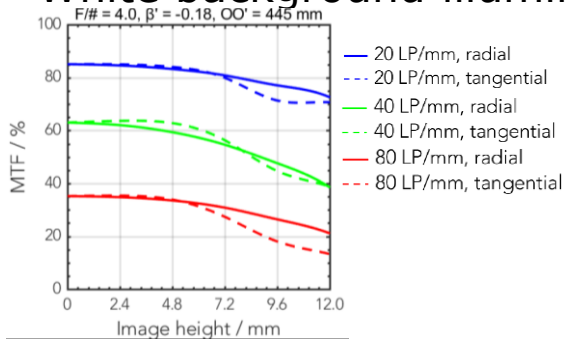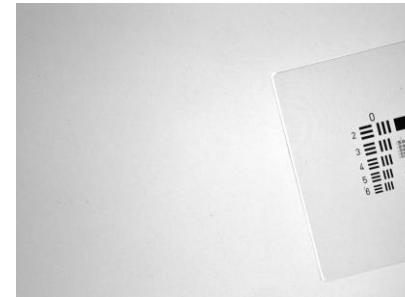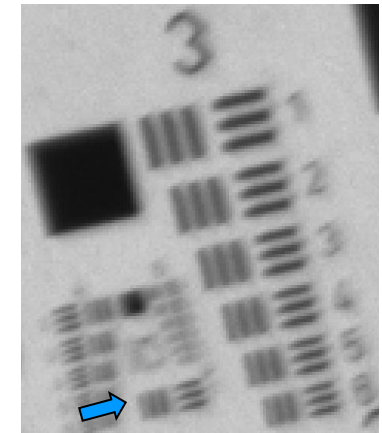

	Center	Edge	Corner
USAF element:	3/3	3/1	3/1
Line width (um):	49.61	62.5	62.5
Lp/mm (object):	10	8	8
Magnification:	0.077	0.077	0.077
Lp/mm (image):	**130**	**103**	**103**

2.64 dpt, 320 mm WD F#/4

Camera

Sensor size = 4104x3006 pixels

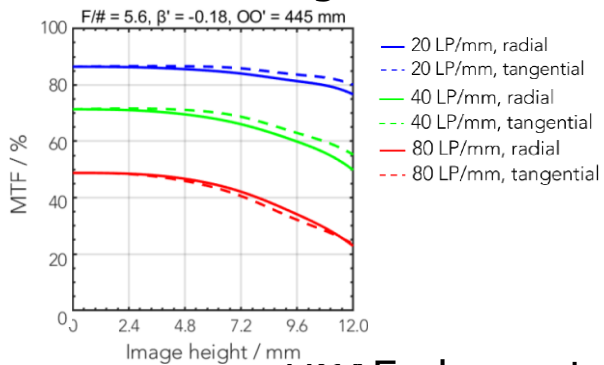Nyquist limit = 144 lp/mm

Pixel size = 3.45 um

Light

White background illumination

	Center	Edge	Corner
USAF element:	4/5	4/3	4/1
Line width (um):	19.69	24.8	31.25
Lp/mm (object):	25	20	16
Magnification:	0.191	0.192	0.192
Lp/mm (image):	**133**	**105**	**83**

2.64 dpt, 320 mm WD F#/5.6

Camera

Sensor size = 4104x3006 pixels

Nyquist limit = 144 lp/mm

Pixel size = 3.45 um

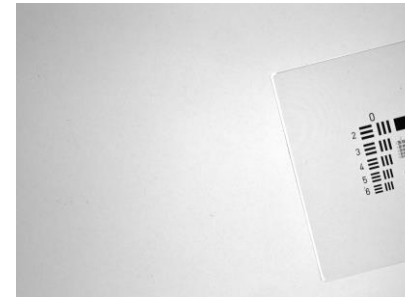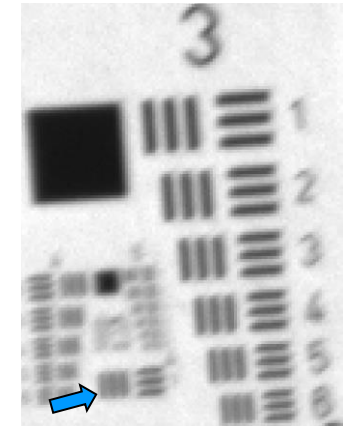**Light**

White background illumination
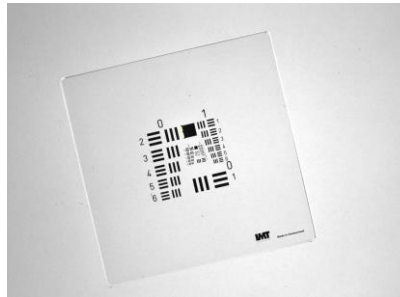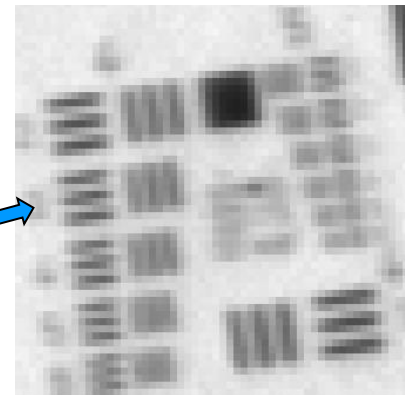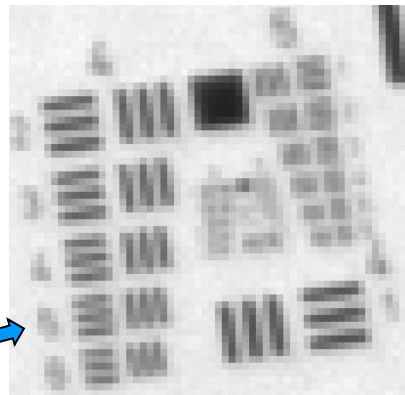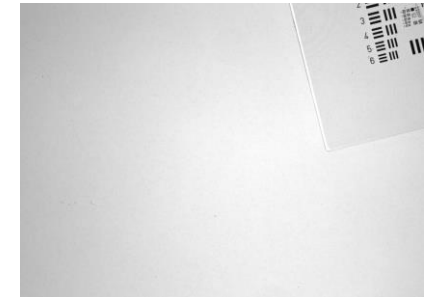
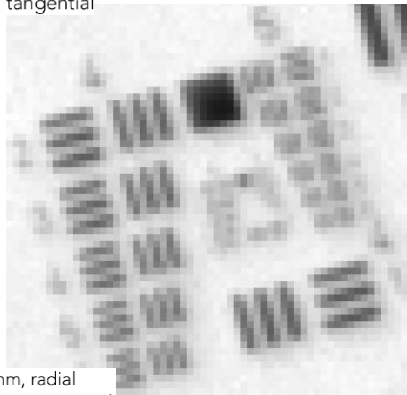|	Center	Edge	Corner
USAF element:	4/5	4/3	4/1
Line width (um):	19.69	24.8	31.25
Lp/mm (object):	25	20	16
Magnification:	0.191	0.192	0.192
Lp/mm (image):	**133**	**105**	**83**

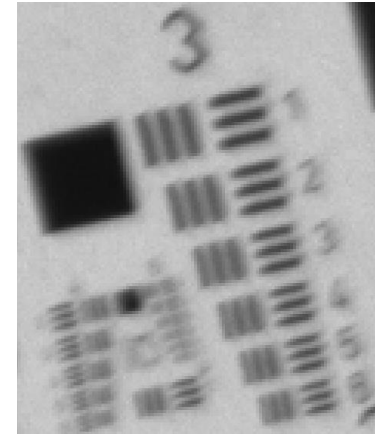# Comparison: F#/4 vs. F#/5.6 @320 mm WD Vertical Optical axis
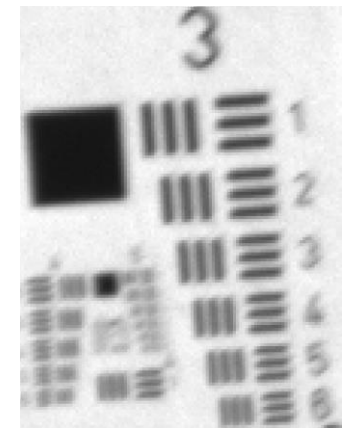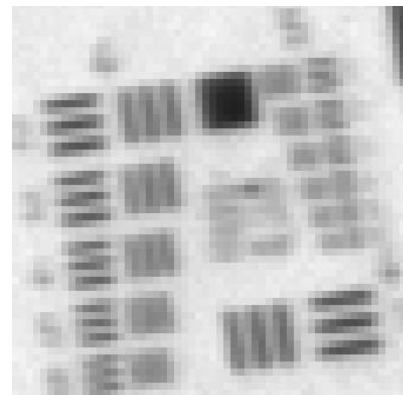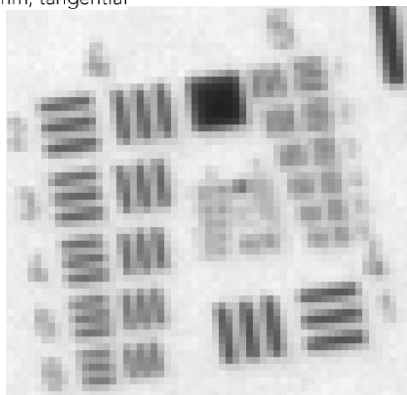

Center

Edge

Corner

F#/4
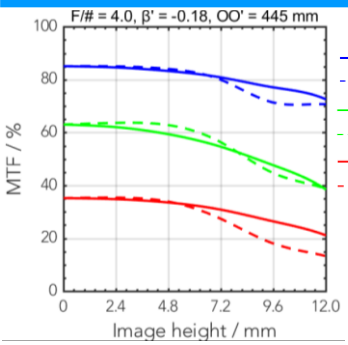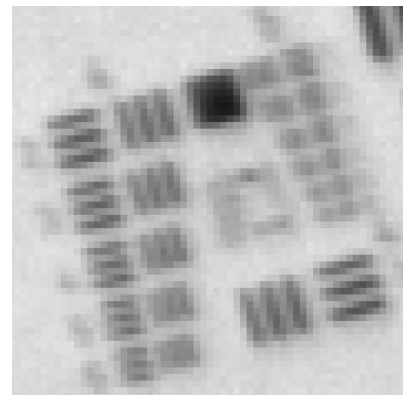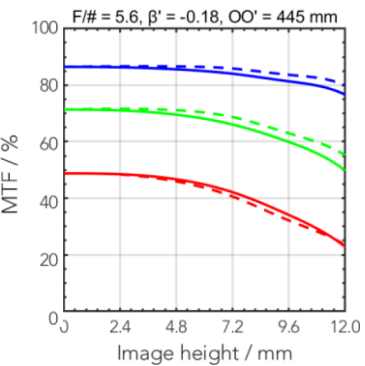
F#/5.6

Horizontal Optical Axis, @0 dpt, 480 mm WD F#/4
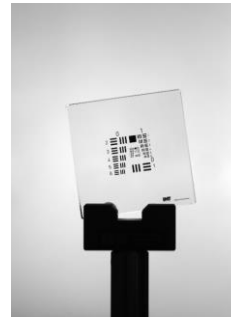
Camera

Sensor size = 4104x3006 pixels

Nyquist limit = 144 lp/mm

Pixel size = 3.45 um

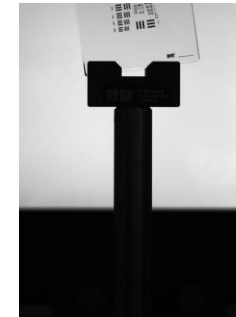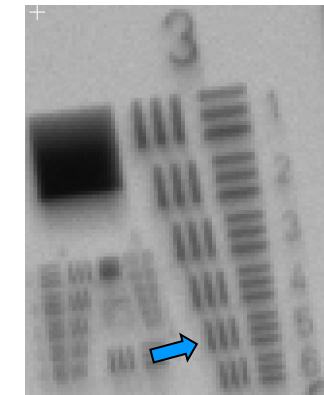**Light**

White background illumination

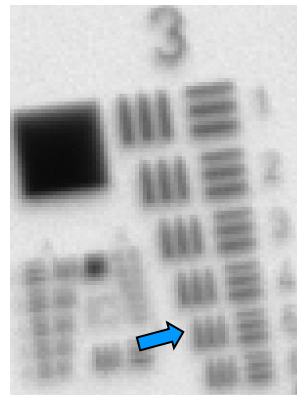|	Center	Edge	Corner
USAF element:	3/5	3/5	3/5
Line width (um):	39.37	39.37	39.37
Lp/mm (object):	13	13	13
Magnification:	0.137	0.137	0.137
Lp/mm (image):	**93**	**93**	**93**

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Horizontal Optical Axis, @ 2.64 dpt, 320 mm WD F#/4

Camera

Sensor size = 4104x3006 pixels

Nyquist limit = 144 lp/mm

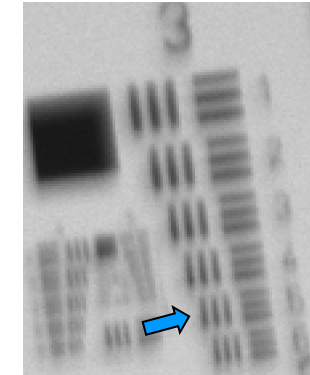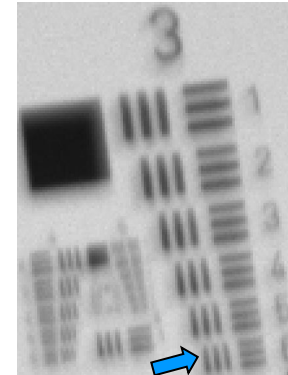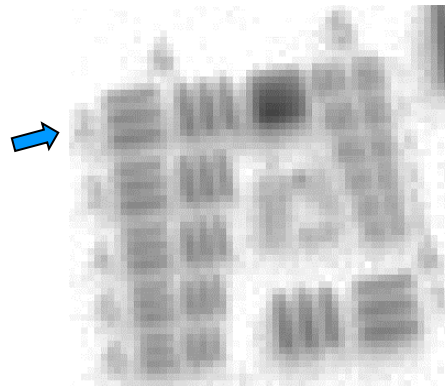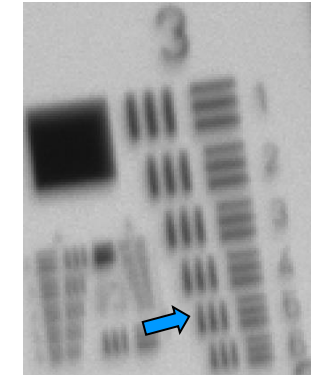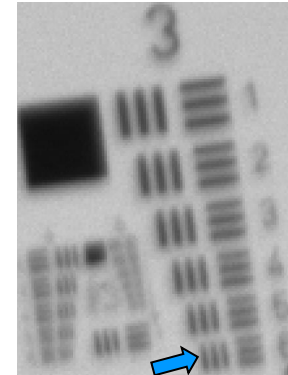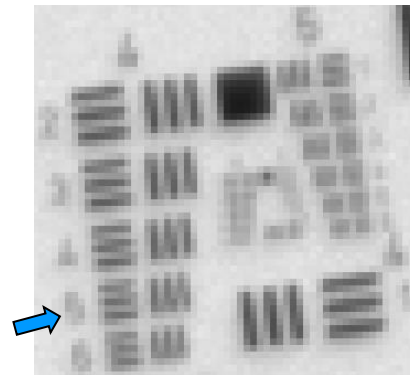Pixel size = 3.45 um

Light

White background illumination

	Center	Edge	Corner
USAF element:	4/2	3/5	3/6
Line width (um):	27.84	39.37	35.08
Lp/mm (object):	18	13	14
Magnification:	0.191	0.192	0.192
Lp/mm (image):	**94**	**66**	**74**

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Horizontal Optical Axis, @ 2.64 dpt, 320 mm WD F#/5.6

Camera

Sensor size = 4104x3006 pixels

Nyquist limit = 144 lp/mm

Pixel size = 3.45 um

Light

White background illumination

	Center	Edge	Corner
USAF element:	4/5	3/5	3/6
Line width (um):	19.69	39.37	35.08
Lp/mm (object):	25	13	14
Magnification:	0.191	0.192	0.192
Lp/mm (image):	**133**	**66**	**74**

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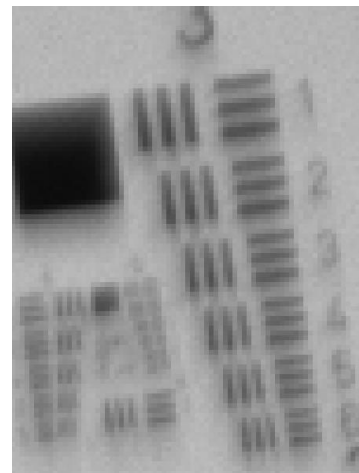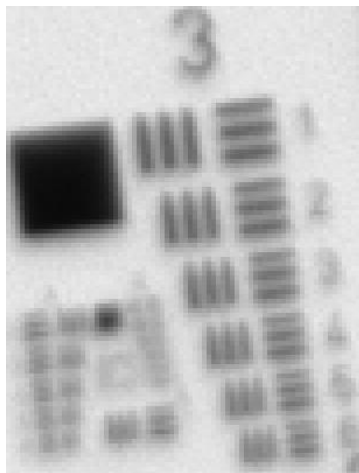
Comparison: Vertical vs. Horizontal Optical axis @ 480 mm WD
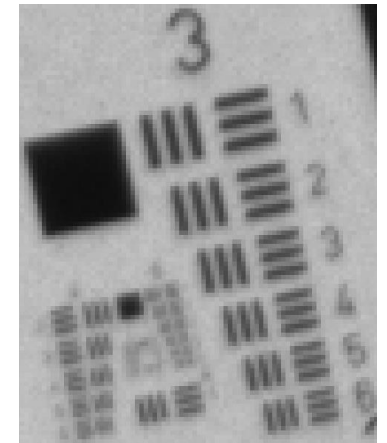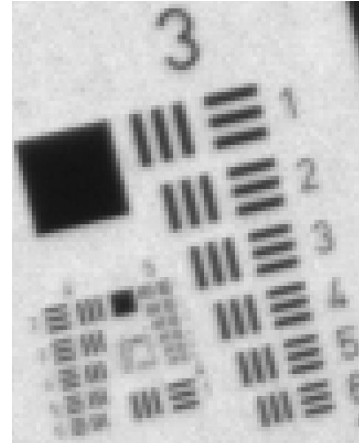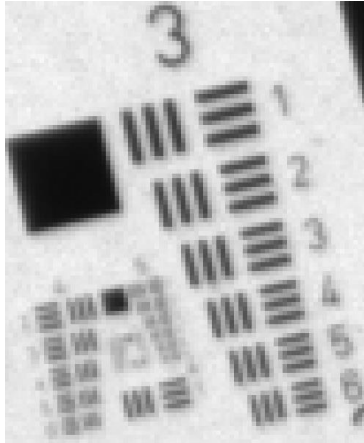
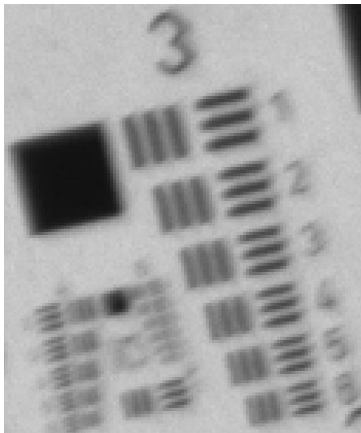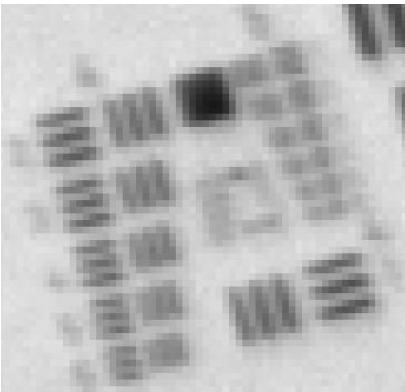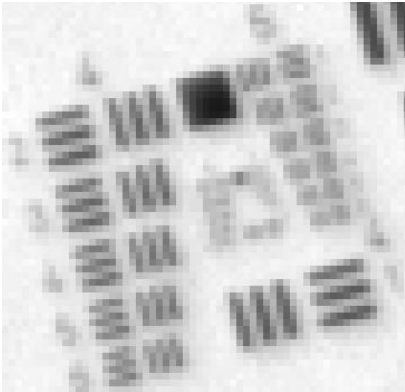|	Center	Edge	Corner
Vertical			
Horizontal			
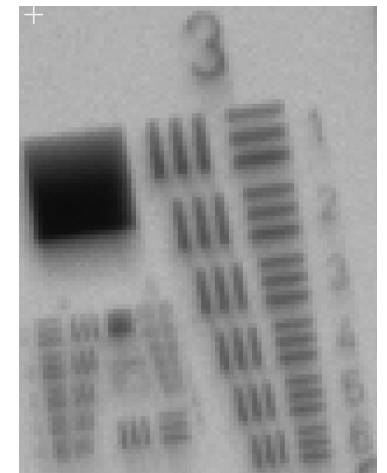
Comparison: Vertical vs. Horizontal Optical axis @320 mm WD

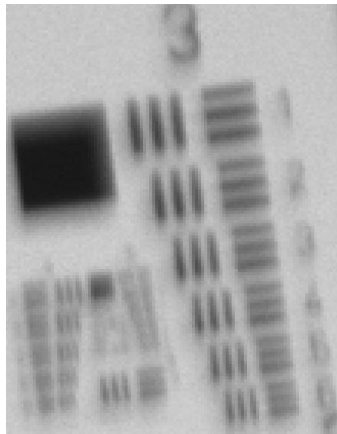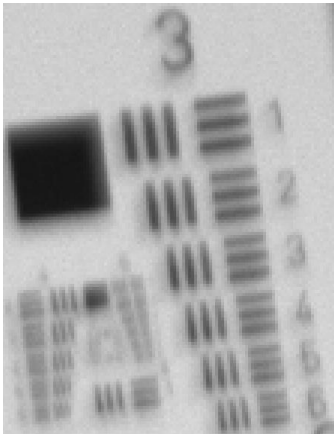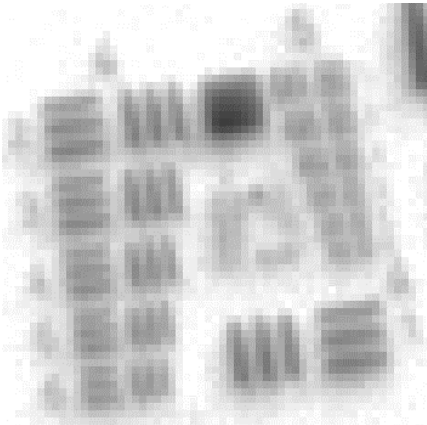|	**Center**	**Edge**	**Corner**
Vertical			
Horizontal			

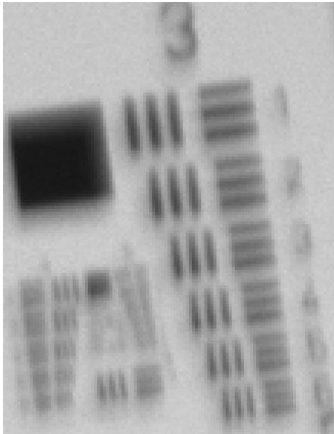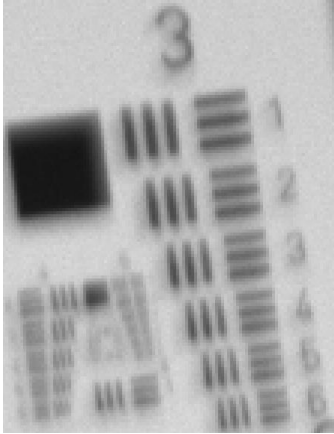# Comparison: F#/4 vs. F#/5.6 @320 mm WD Horizontal Optical axis
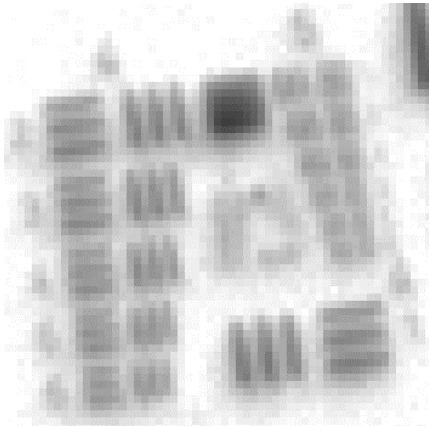
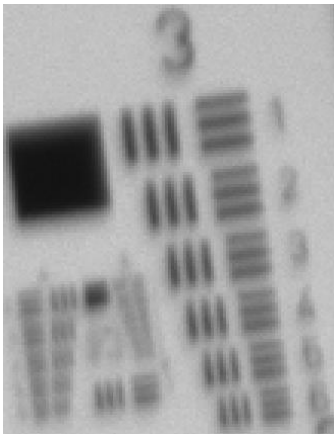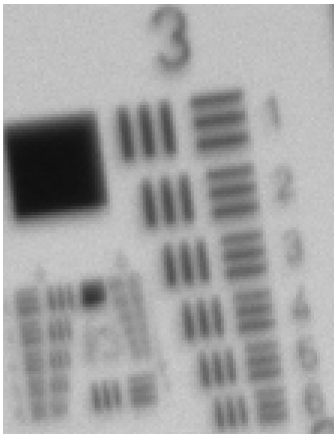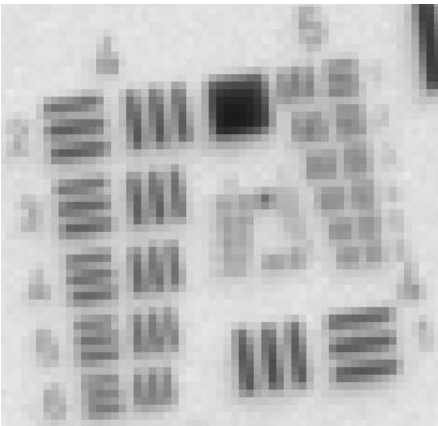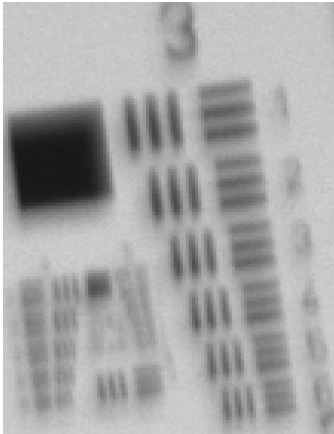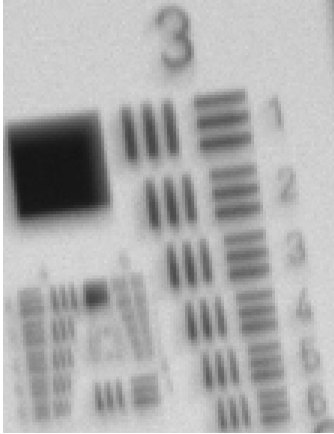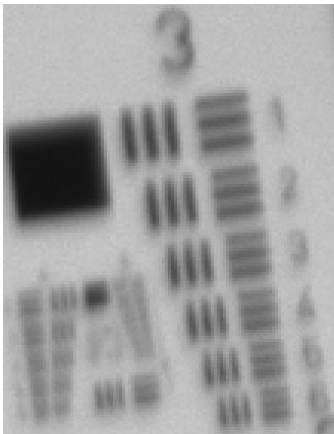# Comparison: F#/4 vs. F#/5.6 @320 mm WD Horizontal Optical axis

Center   **Edge**   **Corner**

F#/4

F#/5.6

This information is confidential to Optotune and is not to be copied or forwarded to any 3rd party without our prior written consent.
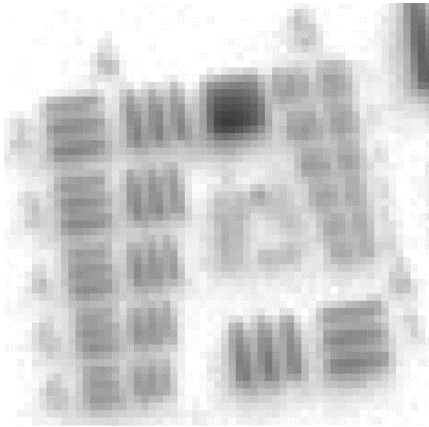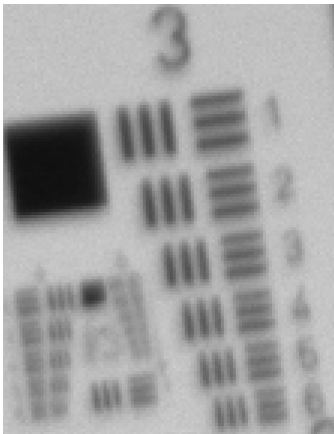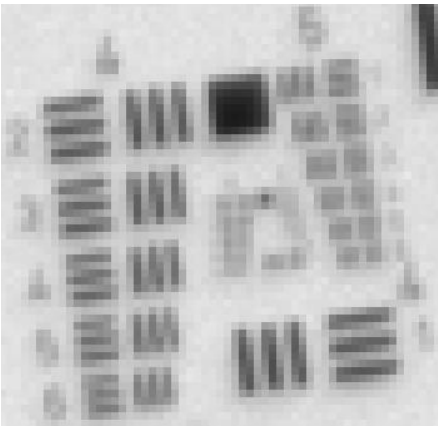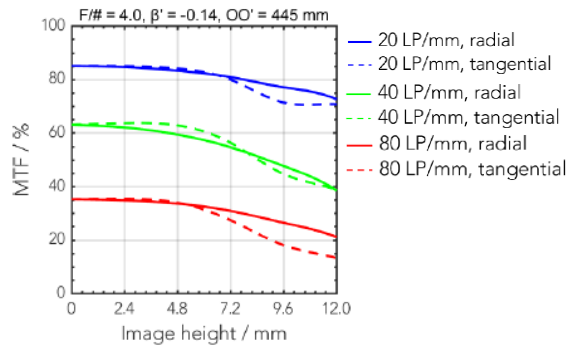
0 dpt, 480 mm WD F#/4

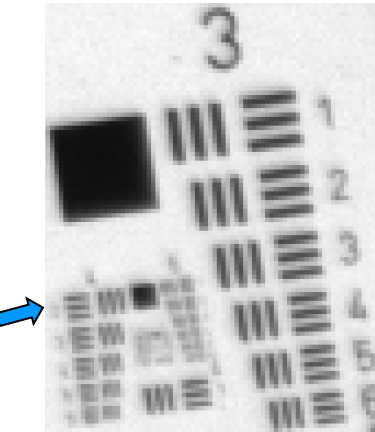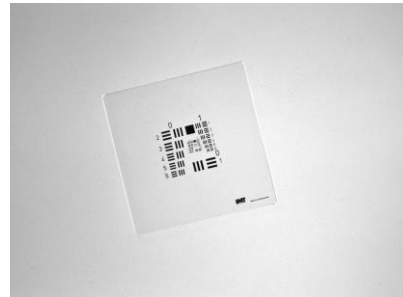## Camera

Sensor size = 4104x3006 pixels

Nyquist limit = 144 lp/mm

Pixel size = 3.45 um

Light

Red background illumination

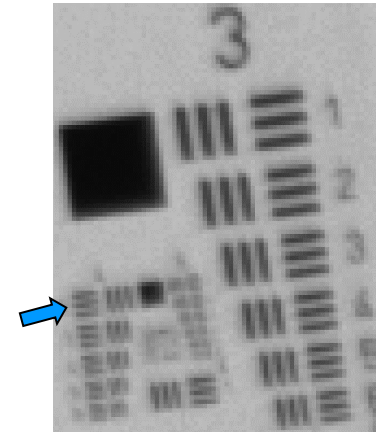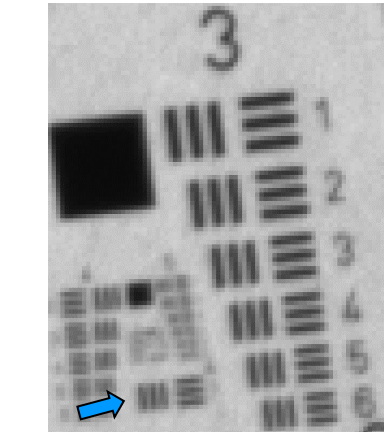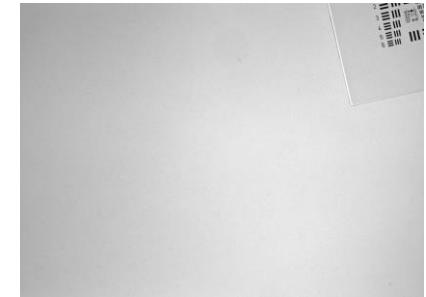|	Center	Edge	Corner
USAF element:	4/2	4/2	4/1
Line width (um):	27.84	27.84	31.25
Lp/mm (object):	18	18	16
Magnification:	0.137	0.137	0.137
Lp/mm (image):	**131**	**131**	**117**

Comparison Red vs. White light

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